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WAR-BOOMED BUSINESS WHEN THE WAR IS OVER.

MR. COREY, formerly president of the steel corporation, is reported to have stated on his return recently from Europe, that the war had three more years to run. Mr. Corey is a man of standing and is entitled to his guess—for at the present juncture it is a guessing contest pure and simple. It does not seem at all probable that peace will be deferred another three years. It might be; and again it may come in a few months. The only fact that can be predicated with certainty is that peace will come—soon or late. And when it comes, what will happen commercially? What will befall the manufacturers in this country who now have the trade that the belligerents used to have and which we were unable in times of peace to wrest from them? Can we keep it, or will Europe forthwith retrieve it?

When the European artisans lay down their arms and go back to their work, can they produce on the same old basis of costs? Their general efficiency must of necessity be materially lowered. Hundreds of thousands of skilled workmen will lie buried in the trenches. Other hundreds of thousands will return to work maimed in body and dulled in mind. Factory organization will be sadly awry, and the whole machinery of production will be quite out of smooth running. Moreover, taxes will be increased and the cost of living inevitably raised. Will not all this mean an increase in manufacturing costs?

Normally it would, but the situation will not be normal; it will be far from it. Europe will have to regain, if not all, at least a substantial part of her lost trade. It will be a case of grim necessity; and when necessity enters into a situation minor factors fade away. England, Germany and France will undoubtedly fight for their old places in the export world, even if the employer has to abandon for the time being all expectation of profit and the employee reduce his comforts to the minimum.

American manufacturers who argue that having secured some of Europe's former trade they will be able to hold it permanently, war or peace, will be likely to discover that they have deceived themselves. There is the dyestuff trade, for instance. The Department of Commerce at Washington is making notable efforts to assist the manufacture of aniline dyes in this country and to protect it against German competition when the war may end, but experienced chemists believe that this industry will be one of the first that the Germans will endeavor to regain, and that it will be difficult to hold it permanently against their competition. The industry has been marvelously organized in that country, and they will have one substantial advantage at the close of the war, namely, an accumulation of coal tar by-products left from the manufacture of explosives which can be used in the making of aniline dyes.

But to confine the discussion solely to the export trade in manufactured rubber goods: In 1913, the last year of normal European trade, the exports of manufactured rubber goods from the United States amounted in value to $12,054,455. During the same twelve months the value of exports of manufactured rubber goods (including insulated cables) from Great Britain amounted to $34,799,790; from Germany, to $32,000,000; from France, $18,331,333; from Russia, $2,784,000—the total exports of manufactured rubber goods from these four belligerent countries amounting in that year to nearly $88,000,000, or over seven times our own.

At present of course no belligerent country is able to maintain this export trade. England has lost over half of hers, France has but little and Germany practically none at all. Naturally, American manufacturers are getting a certain portion of this trade. The question is, how much will they keep after the treaty of peace is signed? Of one thing they can feel quite confident, that they will not be left in quiet and undisturbed possession of their newly acquired customers, for the rubber manufacturers of England and the Continent may be depended upon to make for their old preserves with despatch and determination.

The moral of all of which is that American rubber manufacturers should lay hold of all the extra trade that the war has deflected in their direction, but keep con-

stantly in mind that if they make extensive investments in increased equipment with the expectation of keeping the new business permanently, they must be prepared later to defend it against attack from overseas.

A GIFT THAT IS WORTH A SECOND THOUGHT.

IT is fairly easy to be generous with your savings when you're dead; there is not much temptation to hold back something for yourself in your will. But when a man in fine health, with a reasonable expectation of forty years more of life's varying fortunes, divides up with mankind and gives his fellows a large slice of his accumulations, that's another story. That is unusual. That is unique.

But that is just what Mr. Litchfield, factory manager of The Goodyear Tire & Rubber Co., has done. He has been manager of the Goodyear factory for fifteen years, and by way of celebrating this event, and to show their appreciation of him, his fellow workmen recently gave him a dinner. And he, to show his appreciation of his fellow workmen, presented them with a check for $100,000, as a general welfare fund. Not so bad for a young man of forty! It speaks well for his success as a factory manager and still better for the clearness of his vision as to what life's all about.

SOME INTERESTING CURRENT RUBBER STATISTICS.

SOME recent rubber statistics are rather more than usually interesting. War is invariably a disturbing factor, and undoubtedly the complaints that have come from the rubber planters in the Far East regarding the interference with their shipping facilities are well grounded; and it is also undoubtedly true that the plantation forces have been much disorganized by reason of the absence of many of their young men in service on the Continent. But notwithstanding all these drawbacks the plantations seem to be getting along very comfortably. The imports of plantation rubber at London during the first six months of the present year amounted to 32,166 tons, as compared with 18,074 tons for the corresponding period last year. If the increase of plantation shipments is so rapid under the many present difficulties, what will it be when the times are again normal?

There is another item among recent statistics that is also interesting, namely, a comparison of the current imports of rubber into the United States from London with those of last year. For the first six months of the present year they amounted to 21,757 tons, as compared with 13,034 tons for the corresponding period a year ago; a gain of over 66 per cent. As the imports of Brazilian rubber into London during the six months ending with last June only amounted to 7,506 tons, it is very evident that the great percentage of our imports this year from London consists of plantation rubber; which cannot fail to suggest what a predicament we would have been in if the embargo had been continued.

BEING INDEPENDENT WHEN YOU'RE NOT.

IT has been hinted that American rubber manufacturers really did not need to make an agreement with England as to exports in order to get crude rubber supplies, the argument being that England wants money in the bank very much more than surplus rubber in the warehouse. That is what the Swedes thought, evidently, for they refused an absolute embargo on rubber exports in directions accessible to the enemies of the Allies. As a result Sweden is reported to be in the throes of a rubber famine, which is likely to grow more acute rather than less.

An independent spirit is admirable, but the assumption of independence in a position of dependence has its drawbacks.

WILL BRAZIL VALORIZE AGAIN?

LATE advices from Brazil state that the federal government is definitely contemplating another plan for the valorization of rubber and coffee. The measure has already passed the Chamber of Deputies and is said to have such strong influence back of it that it will undoubtedly pass the Senate in the immediate future. The new president of the republic is believed to have favored the project ever since he came into office. This proposal for valorizing Brazil's chief products is, briefly, as follows: The government will authorize a new issue of 350,000 contos ($90,000,000), a small part of which will be used for taking care of pressing debts while the rest will be employed in financing the coffee and rubber crops. It is the government's hope that this new legislation will, measurably at least, relieve the embarrassment, caused by the war, in Brazilian financial and commercial circles.

Limiting the consideration of this project to its relation to rubber, the plan briefly is that the government shall deposit this new issue of currency with the Bank of Brazil, and the bank shall be authorized to advance 80 per cent. of the value of rubber to producers who place their stock in a warehouse and present the receipt to the bank.

Valorization has been tried a number of times in Brazil, and has never yet proved a success. The last

attempt to valorize rubber was made in 1909, and proved an expensive venture to the Bank of Brazil; but this later plan differs somewhat from any of its predecessors, as apparently it does not comtemplate the withholding from the market for any length of time of any large quantity of rubber. Under the present plan the owner of a quantity of rubber who may be pressed for ready money is not compelled to sell his rubber to the first bidder—usually an intermediary—at whatever price he may be offered. By putting his rubber in the warehouse and securing an advance of 80 per cent. he is afforded time to look for the most advantageous market.

If this government assistance is used only in this way, to enable the owner of the rubber to look about for the highest bidder or to hold his rubber during a few days of exceptionally low prices, until the market reaches its normal level again, it will be an advantage undoubtedly to the producing industry. But if any general attempt is made to hold back Brazilian rubber in large quantities with the expectation of affecting the market generally, the plan will undoubtedly prove quite as ineffective as in the past. If Brazil's valorization venture proved a failure in 1909 when the Amazon production was 42,000 tons as against a plantation output of 3,600 tons, what sort of a corner would Brazil be able to effect in 1915 with an Amazon production not exceeding 30,000 tons, as against a plantation total of 85,000 tons.

FORTY MILLIONS FOR POSSIBLE PUNCTURES.

IT is estimated that there are 1,623,555 pleasure cars equipped with pneumatic tires now in use in the United States. But as it is always wise to be conservative when venturing into statistics we will call the number an even 1,600,000. Assuming that the average cost of properly tiring a car is $25 a wheel, or $100 for the car, we have an aggregate cost of tire equipment for pleasure cars of $160,000,000. That is a fairly large item, but it cannot reasonably be begrudged, as the tires which are in actual use on the four wheels are an essential part of the car, without which the pleasure motor vehicle would be a jolting impossibility.

But what this paragraph is particularly concerned with is that fifth tire which is not in use, but which is necessitated by the always impending puncture. Those 1,600,000 extra tires strapped to the side or to the back of the car as a sort of insurance policy against possible nails or broken glass, cost the car owners forty millions a year. To be sure, that is not all insurance money, because that fifth tire may in time take the place of one which has done its legitimate service and run its allotted number of miles. But generally speaking, the fifth tire performs its expected function of replacing a punctured predecessor, from which it follows that the greater part of the forty million dollars now represented by tires that do not carry but have rather to be carried, is insurance money, pure and simple. Rather a burdensome extra. When will the genuine puncture-proof tire appear which will enable the car owner to start out with only four tires, with the unfailing assurance that the same four will bring him back?

HARD TIMES AND THE CHEWING OF GUM.

THAT species of rubber botanically called *Achras sapota,* but more familiarly known as chicle, may not be a highly important member of the rubber family, but certainly it is one of the most popular members, and its activities must always be followed with interest. It appears that the year ending with last December—twelve months of distinct depression in American industries generally—was one of unusual prosperity for purveyors of chewing gum, if we may judge from the increased profits of the manufacturers of this staple.

Now this question naturally arises: In a year when, owing to changes in tariff and banking systems and to the outbreak of an unprecedented war, the social and commercial world was in a state of pronounced dejection, why should the chewing of gum show a marked increase? Does maxillary activity tend to relieve mental disturbance, lull the restless spirit and banish care? Or is this a matter of pure economics? Do men when times are hard chew gum to save the cost of a fifteen-cent cigar, and do women resort to chiclets as a sort of saving substitute for the seductive sundae? Here is a new field for the psychologists. Where is Professor Münsterberg with his infallible charts?

THE EFFECTS OF THE WAR ON THE COMMERCE, INDUSTRIES AND FINANCES of the United States have been discussed from every angle, but there is one effect—of minor importance but still interesting—which has attracted little if any attention, and that is the marked decrease in immigration since the beginning of hostilities. During the year ending with June, 1914, 1,218,480 new citizens came to our shores. During the year ending with last June, which included eleven months of the war period, the number of immigrants was only 326,709, or but a little over a quarter of the number for the preceding year. The arrivals last June were 22,598 as compared with 71,278 for the same month the year before.

This marked falling off of immigration is not altogether to be regretted. This country is an asylum for the oppressed of all the earth, of course, and in the development of its resources there is still a vast deal of manual labor to be performed which native Americans seem disposed to delegate to new-comers; but for the permanent good of the country, immigration should proceed only as rapidly as it can be properly Americanized. Digested aliens build up the body politic; undigested aliens are liable to give the body politic some sharp stomachic pains.

The Story of Gutta Percha—II.

PHYSICAL PROPERTIES.

JUST why gutta percha is so generally confused with rubber is not apparent to those who know both gums. They are both, to be sure, the products of the coagulated milk of tropical trees. Gutta percha in its manufactured state may resemble hard rubber, but only in appearance. To the expert, rubber is not as much like gutta percha as gold is like platinum. The fact that there are scores of resinous bastard guttas and bastard rubbers of course adds to the popular confusion.

From the beginning the Malay, wild and partly civilized, has been the world's gutta percha gatherer. He elected in the first place to cut down the tree and lop it of branches "to prevent the milk from flowing into the leaves," catching the latex in bamboo tubes, cocoanut shells, folded leaves, or in holes in the ground. His axe is the parang, the oriental equivalent of the machete.

The latex, yellow white, reddish, or even with a brown tinge, flows slowly and at best gives only two or three pounds of gutta from a medium tree. The gatherer, if he gets only a little, rubs the milk in his hands and as it thickens forces it into a hole in a block of wood. The latex in the vessels is boiled with lime juice or cocoanut oil until it coagulates. Just as rubber milk on the Amazon is injured by rain water, so is gutta percha milk, but by reboiling the stringiness disappears.

The gatherer may add certain clays, sago flour or any cheap adulterant that is in sight, but that is to be expected.

Thus crude gutta—the Gutta Muntah—comes from the native gatherers in many shapes and of many qualities. As there are many varieties of gutta producing trees, there are mixtures that produce numberless varieties in the lots that come into the hands of the Chinese traders, who sort, value and mix for the market. The Malays well know the best trees to tap and are able to give the Gutta Taban Merah unadulterated if they so desire; that is, if the Palaquium gutta is plentiful. If, however, there are only a few of that best of all gutta trees, they are apt to mix with it the Minjato, the Simpor, the Putih, or even the Susu. In the long run this it not profitable, for the traders are very alert and pay less for poor lots, but the gatherer does not care. The best grade as it comes from the forest varies in color from light brown to a dirty white. There are always bits of bark in it. Hardness and tenacity are its chief characteristics. Softened in hot water it becomes plastic, but not sticky. When cooled it regains its hardness completely. Invariably such lots have a definite earthy smell. Such would be the products of the Palaquium gutta. Lots taken wholly or in part from other Palaquium would vary in color, being sometimes almost black on the surface and white within, some quite plastic, some hard, some friable, some waxy, and some wet and putrescent.

GUTTA GATHERER'S HOUSEHOLD.

For years the collection of gutta was in the hands of wild Malays who never saw a white man and rarely saw the Chinese traders to whom they bartered their goods. Their method of trading, so it is said, was unique and simple. At certain seasons the gatherer journeyed to the nearest river and deposited his gutta on the bank. The sign of his particular family—a cow, monkey or tiger—molded from gutta, topped the pile. The owner then secreted himself in the jungle and waited. In time along came a Chinese trading boat, which stopped, valued the gum and took it away, leaving in exchange cloth, ornaments, knives, or whatever passed current as valuable from the jungle standpoint. This sort of trading lasted for years, and neither the bloodthirsty savage nor the wily Chinese attempted to get the best of the bargaining. Many such tokens are to be found in the hands of curio collectors today, and as they are always made of the best gutta, they give a better idea of the gum than do the ordinary forest samples.

Gutta percha as it comes to the American or European manufacturer is a composition prepared in the Chinese grading and mixing factories in Singapore. It is the result of the mixing of a variety of lots—good, bad and indifferent—so that certain grades are obtained. This is done by shredding the various lots, boiling them soft and massing them on rolls similar to mangle rolls. So generally is this practiced that unmixed lots are not to be found on the market. This gutta looks and feels like blocks of corky wood. It is this that appears in the laboratory for examination, as well as in the factory for manufacture.

Speaking of the gutta mixers, the writer visited a Singapore "Godown," where mixing and grading was done on a large scale. The Chinese owners made no objection to a careful examination of the various lots of good and bad that were selected for mixing, but when it came to taking photographs they blandly objected, promising to do it themselves later and forward prints—which of course was never done.

Pure gutta percha of the highest grade is colorless and almost transparent in thin cuttings, but shows pinkish in cut sheets about 1/5 millimeter thick, against a white surface. It has no taste and almost no odor, except on decomposition. At ordinary temperatures it has an appearance similar to that of wood—smooth, extremely tough and only slightly elastic. It may show a tensile strength of 525 pounds per square millimeter when stretched 50 to 60 per cent. It is pliable, may be folded, twisted, tied or stretched, and may easily be cut with a sharp blade or pointed tool. Its elasticity is low.

In structure it is cellular but impermeable to water, which it absorbs only in the surface cells. The material becomes fibrous when pulled out and at 100 per cent. elongation it will support, without breaking, double the force that was required to stretch it. Unlike rubber, it is easily torn by a transverse force. The

COAGULATING GUTTA LATEX.

susceptibility of passing from the cellular to the fibrous condition varies in the different kinds of guttas. The more markedly this quality is developed the greater the separation from the low grade guttas known as gutta caoutchouc. Excess of the fibrous structure renders gutta percha too brittle and unsuited to cable making. In its normal condition the specific gravity of gutta percha is 0.979 to 0.999. Compressed specimens show 1.010 to 1.020. Gutta percha is preserved by immersion in cold water. By the action of light and air it rapidly oxidizes to a hard, brittle resin, completely losing its toughness and emitting an acid odor. This change is more rapid in air at 77 to 86 degrees Fahrenheit, if the material is exposed in thin sheets and frequently moistened and dried in the sun. When thus converted into a resin it increases in weight and in solubility in alcohol and alkalies and becomes a good conductor of electricity. All the gutta perchas of commerce contain these oxidation products up to 15 per cent., which are insoluble in water and benzene.

KNEADING AND PRESSING GUTTA CAKES.

In this connection it should be stated that oxidation under the influences of air and light only proceeds slowly when the gum has been well compacted by thorough mastication. This oxidation does not proceed in a constant manner. Some samples will resist all deterioration, while under the same conditions others will crumble on handling. The explanation is offered, in such case, that the commercial gums used are of diverse composition, largely because not standardized by the collectors or traders.

Freshly cut surfaces of gutta percha are not tacky, and will not unite with each other at ordinary temperatures, but if gently heated and pressed in contact strongly they will adhere permanently.

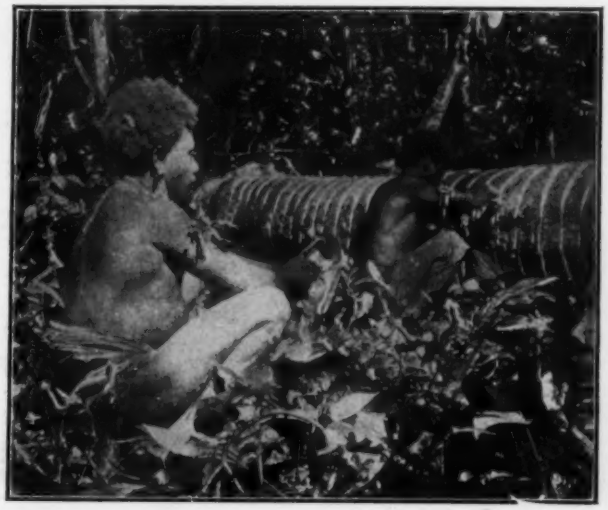
A low temperature, several degrees below zero Fahrenheit, has no effect on gutta percha. The increase of its pliability by heating is noticeable between 85 and 100 degrees Fahrenheit, and at 122 degrees Fahrenheit it yields readily to slight pressure and is capable of receiving and retaining the most delicate impressions. At 194 degrees Fahrenheit it becomes adhesive and pasty, permitting the mass to be freely molded into any desired shape, which it retains at normal temperatures. This characteristic property is due to the air interposed in the pores of the material. At 212 degrees Fahrenheit pasty fusion terminates and the substance resinifies in the air, absorbing 25 per cent. of its volume of oxygen. Melting occurs at 266 degrees Fahrenheit with decomposition and the material remains permanently viscous. Application of higher heat causes boiling and distillation with a carbonaceous residue. The distillates consist of isoprene and caoutchene as colorless oil.

The application of a flame to gutta percha causes it to ignite quickly and burn with a shower of sparks and the dropping of the melted material, after the manner of burning sealing wax.

The impermeability of gutta percha is an extremely important characteristic. Water, either fresh or salt, penetrates to only a very limited depth into its pores. Such mechanically included water in no way changes the dielectric properties of the material if it does not exceed two to three per cent. by weight of the gum.

It is a poor conductor of heat and electricity, being the most valuable dielectric plastic known. Gently rubbed with silk, gutta percha will emit electric sparks practically an inch in length. Faraday, in 1843, discovered the insulating property of gutta percha and foresaw its application. Under water or in the ground it retains, practically permanently, its value as an insulator. According to Wunschendorff, under standard conditions of temperature (75.2 degrees Fahrenheit) and dimensions, the insulating power of gutta percha, referred to copper as unity, is expressed by the number 6×10^{19}.

Gutta percha resists most solvents and is completely insoluble in water at all temperatures. In boiling water it swells and absorbs about 5 to 6 per cent., which it parts with slowly. This mechanically included water may be expelled at 302 degrees Fahrenheit without constitutional change in the gutta percha. Practically insoluble in cold dilute alcohol, its solubility rapidly increases



COLLECTING GUTTA LATEX.

with concentration of the alcohol. If boiled in absolute alcohol it loses 15 to 20 per cent. of its contained oxidized resinous bodies. It dissolves completely in pure ether but is insoluble in ether containing even a small amount of alcohol. It is partly soluble in hot spirits of turpentine, petroleum, olive oil and benzene. The best solvents are carbon bisulphide and chloroform. These do not cause it to swell, like caoutchouc, but solution proceeds from the surface inward. These solvents give cloudy solutions which on filtration are limpid and colorless. Evaporation of the solvent leaves the pure gutta percha as a wax-like body.

Alcohol precipitates gutta percha from its solutions, and the inclusion of some of the solvent renders the material somewhat tacky, particularly if benzene is the solvent.

CHEMICAL PROPERTIES.

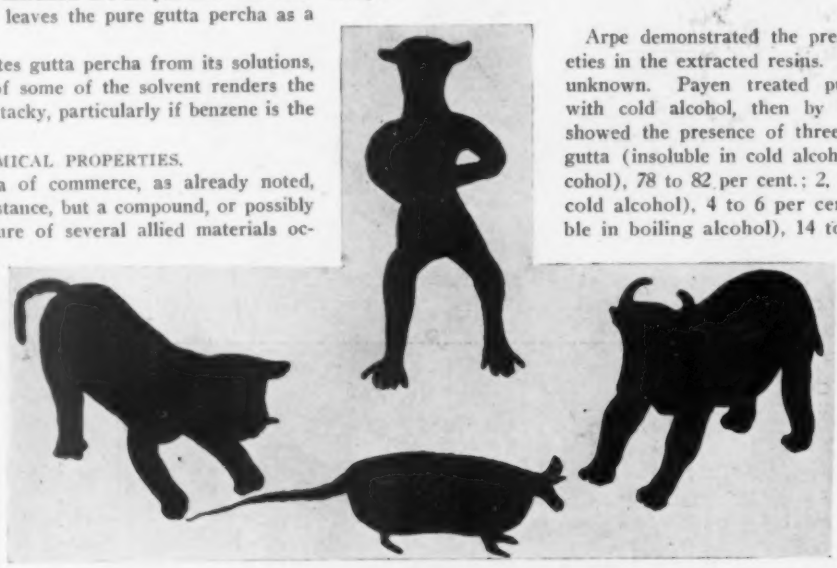
The gutta percha of commerce, as already noted, is not a simple substance, but a compound, or possibly a mechanical mixture of several allied materials occurring in more or less varied proportions, according to botanical origin or conditions of manipulation,

We are indebted to Payen for most of the facts concerning the chemistry of gutta percha.

Pure gutta percha may be prepared by dissolving the sample in carbon bisulphide, filtering, and evaporating the solvent in the air on glass. When purified in this way ordinary commercial gutta percha showed, according to Miller:

Pure gutta percha	79.70
Resins	15.10
Vegetable fiber	2.18
Water	2.50
Ash	0.52
	100.00

Arpe demonstrated the presence of seven varieties in the extracted resins. Their constitution is unknown. Payen treated purified gutta percha with cold alcohol, then by boiling alcohol, and showed the presence of three distinct bodies: 1, gutta (insoluble in cold alcohol and in boiling alcohol), 78 to 82 per cent.; 2, fluavile (insoluble in cold alcohol), 4 to 6 per cent.; 3, albane (soluble in boiling alcohol), 14 to 16 per cent.



FIGURES MODELLED FROM GUTTA.

The separation of these bodies is effected by treating purified gutta percha for several hours with boiling alcohol and filtering. After standing one or two days the alcoholic solution deposits considerable opaque granular matter. The granules contain a nucleus of fluavile, covered with a crystalline incrustation of albane. By repeatedly washing this granular mass with cold alcohol the fluavile is dissolved and the albane remains.

Payen obtained pure gutta as a residue from boiling alcohol extractions. Oudemans in 1858-59 investigated gutta fluavile and albane, determining their properties and analysis. His results are given as follows: Gutta is solid, pliable, extensible, but not elastic between 50 and 85 degrees Fahrenheit. It softens about 113 degrees Fahrenheit and assumes a dark brown coloration, becoming more viscous and transparent as the heat increases.

MAKING CHANNELS ON TRUNK OF A GUTTA TREE WITH HOLLOW CHISEL.

SACRED COW.

At 212 to 230 degrees Fahrenheit it spreads into a soft paste, and liquifies at 266 degrees Fahrenheit, beginning to boil at that temperature, and distills into several hydrocarbides, analogous to those obtained from the distillation of rubber. In presence of acids, dilute alcohol, ether and chloroform, it behaves like rubber. Pure gutta is insoluble in ether and light petroleum spirit at ordinary temperatures, while fluavile and albane readily dissolve. According to Arpe, gutta is not insoluble in ether unless previously treated with alcohol. Treatment with nitric acid causes liberation of formic and hydrocyanic acids. In form of powder it rapidly absorbs oxygen; hydrochloric acid gas trans-

forms it into a brownish black substance, contracting on its surface with the appearance of fusion. It is very unstable and may best be preserved in a solution of common salt. Elementary composition of gutta (Oudemans):

	1.	2.	3.
Carbon	87.64	88.10	88.20
Hydrogen	11.79	11.77	12.00
Oxygen	0.57	0.13	....
	100.00	100.00	100.00

The corresponding formula for gutta would be $C_{20}H_{32}$. The results of Oudemans regarding the elementary composition of gutta, albane and fluavile are confirmed by Baumhauer and establish the opinion that commercial gutta percha contains a hydrocarbide, $C_{20}H_{32}$, mixed with different oxidation products. Distillation decomposes gutta in the same way as rubber. Pure caoutchouc and pure gutta (the unoxidized part of gutta percha) may be regarded as two isomeric compounds of the same series.

Fluavile is a yellowish, transparent resin, a little heavier than water. At 32 degrees Fahrenheit it is hard and brittle, softening at about 122 degrees, pasty at 140 degrees, and fluid at 212 to 230 degrees Fahrenheit. It decomposes at higher temperatures. It is soluble in the cold in alcohol, ether, benzene, spirits of turpentine, carbon disulphide and chloroform. On evaporation of its solvents fluavile is deposited as an amorphous mass. It resists dilute acids and alkaline liquids and is rapidly destroyed by sulphuric and nitric acids. Elementary composition of fluavile (Oudemans):

	1.	2.
Carbon	83.36	83.52
Hydrogen	11.17	11.42
Oxygen	5.47	5.06
	100.00	100.00

Corresponding with the formula $C_{20}H_{32}O$.

Albane is a white crystalline resin showing under the microscope as transparent radiating follicles. It is heavier than water, melts at about 300 degrees Fahrenheit, and is not acted on by hydrochloric acid. It is soluble in benzene, spirits of turpentine, carbon disulphide, ether, chloroform and boiling absolute alcohol. It crystallizes out on cooling from its solutions. Elementary composition of albane (Oudemans):

	1.	2.
Carbon	78.87	78.95
Hydrogen	10.58	10.31
Oxygen	10.55	10.74
	100.00	100.00

Corresponding with the formula $C_{20}H_{32}O_2$. By heating to 266 degrees Fahrenheit it is changed to $C_{20}H_{30}O$.

(To be Continued.)

GUTTA WAREHOUSE, ROTTERDAM.

What the Rubber Chemists Are Doing.

PRESENT STATUS OF SYNTHETIC RUBBER PRODUCTION.

DR. F. W. HINRICHSEN in the "Zeitschrift des Vereines Deutscher Ingenieure," discusses the present situation in regard to the synthetic production of rubber or caoutchouc. There is not today the enthusiastic interest in the matter that existed a few years ago, although it is one of great scientific importance.

Dr. Hinrichsen in his review confines himself to the essentials of the problem, observing that a complete history of its development is impossible, because only a small part of the work done along this line in commercial laboratories has come to the attention of the public.

After Harries in his basic research work in 1905 had determined the chemical constitution of natural rubber, $C_{10}H_{16}$, as that of a 1.5 dimethylcyclooctane of the formula

$$CH_3 \begin{matrix} C{-}CH_2\ CH_2\ CH \\ CH\ CH_2\ CH_2\ C{-}CH_2 \end{matrix}$$

the thought occurred of taking up the synthesis of this hydrocarbon on the basis of the newly acquired knowledge. Some older observations were already at hand. For example, Bouchardat had found that the hydrocarbon isoprene C_5H_8, a volatile, colorless liquid obtained by the dry distillation of rubber, which was originally discovered by Williams, by polymerization in the presence of an aqueous solution of hydrochloric acid, could be converted into a rubber-like substance. Similarly it had been found by Tilden that isoprene, which, in addition to being obtainable from rubber, is also obtainable by passing turpentine through red hot pipes, could be transformed into rubber by means of hydrochloric acid or nitrosylchloride. But since other investigators as well as Tilden did not succeed in repeating this experiment with the same success, in spite of frequent attempts under differing conditions, it was assumed that this had been a pure chance observation and that the substance obtained —which in the state of knowledge of the time could not be definitely proved to be rubber—was not rubber at all, so that the statements of Bouchardat and Tilden were based on errors.

Owing to the enormous rise in the price of rubber a few years ago and the active scientific investigation of the rubber problem, especially by Harries, the attention of industrial circles was directed toward solving the synthetic production of rubber. As a result in 1909 Dr. Fritz Hofmann and Dr. Carl Coutelle, chemists of the Elberfeld Dye Works, obtained absolutely pure isoprene process and were the first to convert it into rubber by simply heating it in a closed tube separately or in the presence of certain other substances. A sample of this rubber was sent to Harries, who proved chemically with absolute certainty that it actually was rubber. As the method of Hofmann and Coutelle was not then publicly known, Harries took up experiments to transform isoprene into rubber. In a lecture in Vienna in 1910 he reported his observation that it was possible to convert isoprene into rubber by heating in a closed tube in the presence of glacial acetic acid. Harries deserves credit for thus publishing a method which could be repeated by others.

Creditable work in the technical development of the problem was done by numerous individual German and other scientists, by the Elberfeld Dye Works and by the Baden Aniline & Soda Works. In the original patent specification of the Elberfeld Dye Works the inventors did not confine themselves to the use of isoprene as the basic material, but included the use of a series of hydrocarbons of similar composition and behavior toward polymerization, namely hydrocarbons with a so-called system of conjugated double bonds, such, for example, as erythrene and dimethylbutane and many other similarly constructed substances.

On account of the differences in the basic material there was a possibility of obtaining a series of different rubbers which naturally differed in their chemical constitution. It was also found that the process of polymerization was capable of various modifications and that the rubbers obtained by employing different methods with the same basic substance varied among themselves.

It was thus observed independently by Harries and the English investigators, Mathews and Strange, that polymerization in the presence of metallic sodium proceeds at great velocity and the resulting rubber differs materially in its properties from that produced by mere heating. The chemists of the Baden Aniline & Soda Works found that if polymerization by sodium is carried on in an atmosphere of carbonic acid the results are different. A further process worked out by the same company is based on the use of ozonizers on peroxide as catalizers.

Thus various rubbers may be obtained differing from each other in their properties according to the nature of the prime materials and the method of polymerization. The following compilation, according to Holt, is a concise resumé of a series of such differing rubber-like substances.

RUBBERS FROM BUTANES.

Standard rubber (by heating): Easily soluble, elastic and capable of being vulcanized.

Ozonide rubber: Insoluble, strongly inflatable, very elastic, not capable of being vulcanized.

Carbonic acid rubber; not soluble, not inflatable, moderately elastic, not capable of being vulcanized.

Sodium rubber: Easily soluble, elastic, capable of being vulcanized.

RUBBERS FROM ISOPRENE.

Standard rubber: Easily soluble, elastic, capable of being vulcanized.

Ozonide rubber: Soluble only after calendering, strongly inflatable, elastic, capable of being vulcanized.

Carbonic acid rubber: Insoluble, not inflatable, elastic, capable of being vulcanized.

Sodium rubber: Easily soluble, not elastic, can be vulcanized incompletely and only with difficulty.

RUBBERS FROM DIMETHYL BUTANES.

Standard rubber: Easily soluble, not elastic, capable of being vulcanized as hard rubber only.

Ozonide rubber: Soluble only after calendering, inflatable, not elastic, can be vulcanized as hard rubber only.

Carbonic acid rubber: Insoluble, not inflatable, not elastic, can be vulcanized only with difficulty and is easily oxidized.

Sodium rubber: Soluble and insoluble modifications, inelastic and incapable of vulcanization.

This possibility of obtaining substances of varying properties by changing the basic materials and the process of polymerization gave rise to the hope of producing at will rubbers with properties adapted to special applications, somewhat as in the dyestuffs industry colors are modified at will. The commercial importance of rubber synthesis depends on the product equaling natural rubber in two respects, price and practical applicability.

The price factor depends in the first instance on the manufacturing cost of the hydrocarbons of the isoprene series which are used as the basic materials.

Progress has been made in this field by the Baden Aniline & Soda Works, which starts with certain fractions of petroleum. Other available substances are starch, amyl alcohol, turpentine, acetylene, etc. With all the processes there are such large quantities of by-products that their removal or utilization would constitute a problem even more difficult than that of the production

of the rubber itself. At present there is no possibility of serious competition of artificial with plantation rubber as regards price.

As regards practical utility synthetic rubbers seem to lack the durability of natural rubber because the latter, by its vegetable origin, contains a series of associated substances, resins, albumen, etc., which undoubtedly have an influence on its durability, for it is well known that deresinated rubber is much more easily attacked by the oxygen of the air than rubber containing resin. Possibly these associated substances act as protective colloids which reduce the vulnerability of the pure substance.

A further reason why synthetic rubbers are inferior to natural rubber in mechanical properties is that the former are not uniform substances but mixtures. According to recent investigations of Steimmig, in the oxygen splitting of synthetic rubbers there appears in addition to Coulinie acid and Coulinie aldehyde, which, according to Harries, correspond to natural rubber, resinous acid and acetonyl-acetone.

The two last mentioned substances indicate that in the polymerization of isoprene, in addition to the 1.5-dimethylcyclooctanes, a smaller amount (20 per cent.) of the 1.6 compound must have been formed by abnormal condensation, which, upon being split by means of ozone, furnishes the two components mentioned. The latter have never been found in natural rubber. Until possible to arrange the conditions of polymerization so that the synthetic rubbers will constitute uniform compounds, it is not to be expected that synthetic rubbers will equal natural rubber in its useful properties.

SULPHIDE AND SULPHATE SULPHUR AND THE ACTION OF SOLVENTS ON VULCANIZED RUBBER.

The presence of metallic sulphides and sulphates in technical rubber articles complicates the estimation of the "combined" sulphur or "coefficient of vulcanization." Ordinarily the free sulphur and that present as substitute are extracted with acetone and alcoholic potash respectively. In the absence of sulphides and sulphates an estimation of sulphur in the residue gives the percentage in combination with the rubber. In the presence of sulphides and sulphates it is usual to heat a portion of the residue with high boiling point solvents to destroy the rubber and render it soluble. The sulphur is then estimated in the washed mineral residue. The sulphur is also estimated in another portion of the extracted rubber, and the sulphur combined with the rubber estimated by difference.

The method is unsatisfactory and has two disadvantages. First, many vulcanized rubbers are decomposed with difficulty. They carbonize and cake even at carefully regulated temperatures. Consequently the residue, after washing with benzene contains undissolved organic matter which protects the decomposition of the mineral sulphides. Second, the method assumes that the vulcanized rubber does not react with basic substances, such as litharge or magnesia, present in the mixing during heating, with formation of metallic sulphides, although vulcanizing temperatures are employed.

The method described below is applicable to those sulphides decomposable by heating with acids. It is, therefore, suitable for the estimation of the sulphides of zinc and lead. The metallic sulphides in either vulcanized or unvulcanized rubbers are so protected by the rubber surrounding the mineral particles that the surface only is attacked by prolonged boiling with strong hydrocholoric acid solution. If the vulcanized rubber be first swollen in a suitable solvent in which the aqueous acid is partly soluble, the metallic sulphides of lead and zinc are easily and completely decomposed. Ordinary methylated ether has been found the most suitable solvent. If preferred, benzene or one of the chlorinated hydrocarbons, such as dichlorethylene, can be employed. Liberated hydrogen sulphide is estimated and calculated to percentage of sulphide sulphur.

Estimation of hydrogen sulphide by oxidation to sulphuric acid does not prove satisfactory. Best results are obtained by precipitation in lead acetate solution. The absorption is very complete in the first bottle. The freshly precipitated and washed sulphide is decomposed by shaking with iodine solution.

ESTIMATION OF SULPHIDE SULPHUR.

To determine the sulphide sulphur, 20 c.c. of concentrated hydrochloric acid and 30 c.c. of ether are placed in a Voigt's flask (a flask having a ground in stopper carrying an outlet tube and a side inlet tube which passes through the side of the flask and reaches nearly to the bottom). The air is expelled from the flask by a current of carbon dioxide. The flask is then connected with an absorption apparatus containing lead acetate solution and a weighed quantity of rubber is introduced. The rubbers swells gradually and after about 15 minutes the ether, together with evolved hydrogen sulphide, is driven over into the absorption apparatus by gentle heat. The decomposition is completed by boiling the mixture a few minutes. Traces of hydrogen sulphide are removed by a current of carbon dioxide and the lead sulphide is collected, washed and titrated iodometrically.

ESTIMATION OF SULPHATE SULPHUR.

The residue in the Voigt flask, containing the sulphates is extracted repeatedly with hydrochloric acid and the sulphates determined as barium sulphate.

ACTION OF SOLVENTS ON VULCANIZED RUBBER.

Ether, in presence of hydrochloric acid, gradually dissolves vulcanized rubber at the ordinary temperature, and the dissolved rubber contains about 1.5 per cent. sulphur. A mixture of benzene and hydrochloric acid also dissolves vulcanized rubber. Chlorohydrocarbons act similarly to the mixture of solvents and hydrocholoric acids, but are no more rapid than a mixture of benzene and acids.

REAGENT FOR RUBBER ANALYSIS.

Douglas F. Twiss, in analytic work on rubber, finds that a mixture of equal parts by volume of concentrated hydrochloric acid and ether acts readily on rubber mixings at ordinary temperature, the penetration of the acid being greatly facilitated by the swelling action of the ether. The use of a similar mixture has been proposed by H. P. Stevens as the basis of his method for the estimation of free sulphur in rubber mixings.

Another application for this reagent is the neutralization of accelerators, such as litharge, before attempting the removal of free sulphur from rapid curing mixings. Where necessary to examine the content of combined sulphur in a partially cured rubber mix which contains much mineral accelerator and free sulphur, the conversion of the accelerator into an inert substance before the acetone extraction has the advantage of removing the likelihood of vulcanization during extraction.

To effect such purpose the procedure used is to treat 1 to 2 grams of the rubber with the acid-ether reagent until this reagent penetrates throughout the mass. The progress of the action, in presence of litharge, is easily followed by the change in color. The change is usually completed in a day. The rubber mass can then be removed or the ether evaporated. The mass is next washed in running water and dried. It is then ready for acetone extraction and the combined sulphur estimated in the residual rubber. If mineral sulphates are absent, the sulphur in the extracted rubber may be considered as organically combined sulphur. It is safer to begin with two samples and to estimate the total free and combined sulphur in one and free sulphur in the other. The above process appears to be desirable where there are large quantities of free sulphur and accelerator. In the opposite instance the method of Stevens is pronounced perfectly satisfactory.

PATENTED TREATMENT OF RUBBER.

IMPROVED COMPOSITION FOR RUBBER THREAD.—British patent No. 14,355 (1914), W. P. Bradley. Addition of 2 to 7 per cent. each of lampblack and ceresin wax to the quantity of rubber used.

The lampblack affords protection from the injurious effects of light and the ceresin increases the effective resistance to oxidation, preserves tensile strength and elasticity and minimizes surface abrasion.

TREATMENT OF LATEX FOR EXTRACTION OF RUBBER.—United States patent No. 1,145,351, Samuel C. Davidson. The inventor's object is to eliminate the "resinous, protein, gummy and oily constituents of the latex" from the coagulated rubber and bring into intimate mixture with the latter precipitated sulphur from solution of a sodium or potassium thiosulphate by the addition of dilute acid.

United States patent No. 1,146,851, Samuel C. Davidson. In addition to sulphur precipitated from alkaline polysulphides the inventor adds to the latex "alkalized cresol" as a preservative.

PRODUCTION OF CAOUTCHOUC FROM ISOPRENE.—United States patent, 1,146,253, Arthur Heinmann. The process consists of first passing a substantial amount of free ozone through isoprene while maintaining the latter at a low temperature, and then heating the product to a temperature of approximately 105 degrees C. for a time sufficient to effect polymerization.

PATENTED RUBBER SUBSTITUTE.—E. Serre, French patent No. 474,220 (1913). In the preparation of a chlorosulphide rubber substitute the oil undergoing treatment with sulphur monochloride is mixed with a "moderator" the function of which is to reduce any dichloride present, and absorb any excess of monochloride remaining after the reaction and compensate by the dilatation of one of its constituents (retene), the contraction of the mass on solidification: 820 parts by weight of cottonseed oil is mixed with 20 parts of "moderator," consisting of flowers of sulphur, 1; sylvestrene or pinene, 2; cottonseed oil, 12; a retene, 5 parts; and vulcanized with 160 parts of sulphur chloride. The product is adapted for filling motor tires.

TREATMENT OF RUBBER LATEX.—A. Woosman, English patent No. 6,215 (1914). Smoke from a furnace is passed into a chamber, in which is an open pan containing latex, and is distributed by a baffle within the pan. A horizontal cylindrical drum, provided with perforations and grooves, rotates and churns the latex with the smoke.

REGENERATING RUBBER.—C. E. Anquetil, French patent No. 473,787 (1913). Vulcanized rubber waste is saturated with a chlorine derivative of ethylene or methylene, such as trichloroethylene, either by exposure to its vapor in a chamber heated to 60 degrees C., or by immersion in the liquid for not longer than 2 hours. The mass becomes very friable under this treatment, and can readily be freed from impurities by crushing and passing it through a sieve. The portion passing the sieve is dissolved by one of the usual solvents and the rubber precipitated by pouring the solution into a mixture of alcohol and acetone. The process of solution can be carried out in less than 2 hours.

SYNTHETIC RUBBER MANUFACTURE.—A. Haas, French patent No. 473,971 (1913). Starchy material is heated in a hermetically closed vessel with about 1 per cent. of rubber latex at 40 degrees C. for several days. The fermented product is transferred by means of air pressure into a second vessel containing a mixture of tetrachloroethane (2 parts) and trichloroethylene (1 part). By means of a steam coil the temperature is raised to 80 degrees C., and under this treatment the mass becomes completely anhydrous. By the pressure of the gases generated in the second vessel the fluid mass passes by a pipe into a third vessel, containing a solid hydrocarbon (such as camphor or its substitutes) to the amount of 4 per cent. of the original starchy material. The product is finally drawn off from the third vessel and freed from solvents by distillation. The residue is said to "possess all the properties of rubber."

COAGULATION OF LATEX.—R. C. Fulton and D. A. MacCullum, British patent No. 9,066 (1914). Rubber latex is coagulated and cured by treatment with aldehydes or ketones other than formaldehyde in an inert carrier or diluent such as water, but excluding alcohol. For example 80-90 parts of water are added to 10-20 parts of aldehyde or ketone, and this diluted solution may be used with about half its volume of latex, which is preferably poured or sprayed over the coagulant. Formation to the extent of one per cent. may be added to the latex before coagulation.

INSULATING VARNISH.—Carl Baeder, United States patent No. 1,149,171. A composition comprising a resinous base, linseed oil, rubber, sulphur, acetate of lead and an oxygen compound of manganese yielding a dry residuum with low electrical conductivity, great flexibility and low degree of brittleness. [The inventor has evidently overlooked the deleterious effect of manganese compounds on rubber.]

PROCESS FOR MAKING CAOUTCHOUC SUBSTANCE.—Kurt Gottlob, United States patent No. 1,149,577. This consists of twenty-four claims, the gist of which is the process of producing a caoutchouc substance by polymerizing isoprene or a butadiene hydrocarbon in a dilute aqueous solution of egg albumen, emulsifying the mixture during polymerization and finally separating the caoutchouc substance.

CAOUTCHOUC SUBSTANCE AND VULCANIZATION PRODUCT.—Fritz Hofmann and Kurt Gottlob, United States patent No. 1,149,580. The process of producing vulcanized rubber by incorporating with rubber a small amount of an ammonium compound having a dissociation constant than 1×10^{8}, and having a basic reaction at the vulcanizing temperature, and heating this mixture with a vulcanizing agent to effect vulcanization. Aldehyde and acetaldehyde ammonium compounds are referred to.

PROCESS FOR MAKING SOLID PLASTIC SUBSTANCES OF GLYCERINE AND GELATINE.

Solid plastic substances, such as are used for covering printers' rollers are made by melting together various combinations of glycerine, gelatines, coal tar, vegetable tar, wood pitch, resin, turpentine or rubber mixed with sulphur and camphor, together with some hardening agent like formaldehyde. A new German patent provides for replacing the camphor, which is an expensive addition, by aliphatic and aromatic acid esters, such as vinegar, benzo acid ester, and the like, or by acid ester oxides, such as sour milk, salicylic acid ester; sulphur also to be used as well as formaldehyde. The compound is passed through a calender and vulcanized for 30 minutes at 238 degrees F. [German patent No. 284,708 (1911), Julius Stockhausen.]

NATIONAL EXPOSITION OF CHEMICAL INDUSTRIES.

President Wilson has been invited to open the National Exposition of Chemical Industries on Monday, September 20, at the Grand Central Palace, New York City. This exposition will be an important event in the history of the industries dependent on chemistry, and can not fail to be far reaching in its results. Elaborate exhibits are arranged, many as working units showing the processes or apparatus in actual work.

Among the organizations co-operating to make this exposition a success are the American Chemical Society, the American Electrochemical Society, the Amerian Institute of Mining Engineers, the Amerian Institute of Electrical Engineers, American Pulp and Paper Associations, Technical Section, and the Bureau of Economics.

The program of meetings and papers is one of unusual interest. Important papers will be presented on scientific, industrial and trade topics. A great variety of moving pictures will be shown daily, illustrating a wide range of manufacture—chemical, electrical and metallurgical.

Eight bureaus in the Department of Commerce, Interior and Agriculture will present noteworthy and instructive exhibits. A few exhibitors of special interest to the rubber trade are the American Hard Rubber Co., the Automatic Weighing Machine Co., the Buffalo Foundry & Machine Co., the Boonton Rubber Co., the Condensite Co. of America, the J. P. Devine Co., Eimer & Amend and the General Bakelite Co.

The Manufacture of Balloon Fabrics in Europe.

IN balloon construction rubberized fabrics are used much more extensively than for aeroplanes, for dirigible fabrics must be gas-proof and at the same time have great tensile strength. Fabrics treated with linseed oil will not hold hydrogen and are therefore useless. Dirigible balloon bags are made of "doubled" cotton fabrics, the layers being held together by two thicknesses of rubber—one of pure gum, uncured, the other of vulcanized Para; and the inside of the whole is coated with vulcanized rubber.

These "doubled" fabrics weigh from 320 to 340 grams per square meter (1.04 to 1.10 ounces to the square foot), and their tensile strength is from 1,400 to 1,500 kilograms per running meter (78.39 to 83.99 pounds to the inch) on fabric 0.3 millimeters (0.118 inches) in thickness. Acetate of cellulose is also used for coating balloon fabrics; for, like triacetine varnish, acetate of cellulose allows the balloon fabric to retain all its suppleness and does not injure it as does linseed oil. Fabrics coated with this composition are absolutely hydrogen gas-proof. Linseed oil is used for coating spherical balloons on account of its low cost, but the fabric lasts much better when treated with acetate of cellulose.

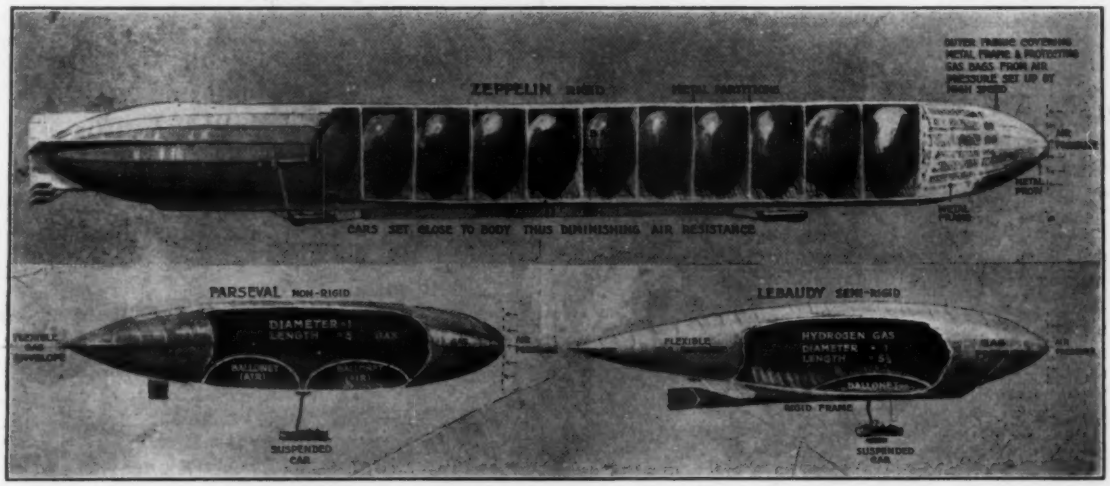
FABRICS.

Silk and cotton fabrics are most generally employed in the making of balloons. Pongee silk is considered best, but silk taffeta is also used. The advantage of silk is that it is very light for its great strength. Its disadvantages are its cost, its tendency to become brittle and the faculty it has of accumulating electricity. The ramie fabrics, employed in the construction of some French aeroplanes, do not take rubber easily, and for that reason their role in balloon construction has been limited.

Cotton fabrics are probably best suited and certainly most generally used in the construction of balloons. Egyptian and East Indian are considered best, the English, Bohemian and Alsatian weaves being the most highly favored. The thickness of these fabrics varies from 0.015 to 0.037 millimeter (0.00059 to 0.00146 inch). Fibers vary in length from 20 to 30 millimeters (0.78 to 1.18 inch), and the very best English balloon fabrics are made of Lea-Ashland-Mako cotton. The threads must be evenly twisted, perfectly round and of the same thickness throughout. The same number and the same weight of threads are used for both weft and warp. Careful calendering takes out all folds and creases. The fabric must be thoroughly washed and dried before being rubberized. Once this is done the fabric is passed through a calender, the rubber is spread and the fabric allowed to season in a place neither too dry nor too humid. The following table gives the characteristics and price in marks and dollars (before the war) of six sorts of cotton balloon fabrics manufactured by a leading German company:

Nos.	Weight, in grams (15.432 grains, troy) per square meter (10.76 sq. feet)	Number of threads per square centimeter (.155 sq. inches)	Breaking load per running meter (39.37 inches) Warp.	Weft.	Price per square meter Marks.	Dollars.
1.....	52- 55	56-54	480	460	1.40	0.333
2.....	65- 67	54-52	560	560	1.44	0.343
3.....	85- 87	54-52	920	880	1.30	0.309
4.....	103-105	52-50	950	900	1.35	0.321
5.....	115-117	52.50	1.250	1.200	1.45	0.345
6.....	135-138	42-44	1.400	1.500	1.60	0.380

Nos. 1, 3 and 5 answer practically all purposes. Fabric No. 1 is made especially for small aerostats, such as registering balloons, where it is used single-fold. It also is used, "doubled" (double-fold), for making the compartments of large dirigible balloons, such as the Zeppelins, in which the plies are assembled parallel, and in French balloons of the "Zodiac" make, where it is employed in making the inside "balloonets" or air sacks used for "trimming" the balloon. Fabric No. 3 is used single-fold for the outer cover of "Zeppelins" and "Schütte-Lanz" dirigibles; also for building signal balloons and kites, while doubled, it serves in the construction of small dirigibles of the "Ruthenberg," "Lebaudy," "Zodiac" and "Clouth" types; also for spherical balloons. Fabric No. 5, doubled, is used in building dirigibles like the "Suchard." Used in combination with one another, or used singly, the three types of rubberized fabrics —Nos. 1, 3 and 5—offer almost unlimited possibilities. Cheap fabrics are always full of knots, bare spots and other irregularities and therefore cannot be considered as proper for balloon construction. Further, they are heavy and not easy to rubberize.

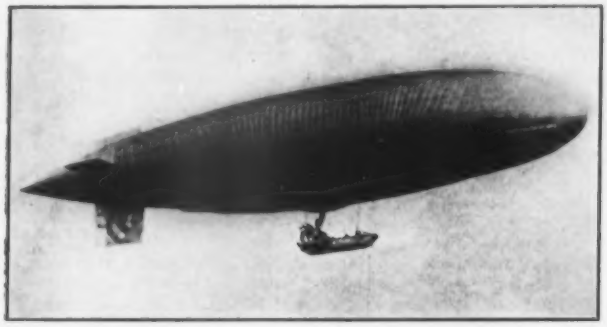


TYPES OF DIRIGIBLE BALLOONS.

COLORING.

The coloring of rubberized balloon fabrics is of vital importance, for light and ultra-violet rays are especially dangerous to

the rubber coating. Exhaustive experiments made by the noted French scientist, Victor Henri, demonstrated that chrome yellow (neutral chromate of lead) and aniline yellow absorb ultra-violet rays and nullify their effects. In France the first is most popular, while in Germany the second is most employed. Tightly



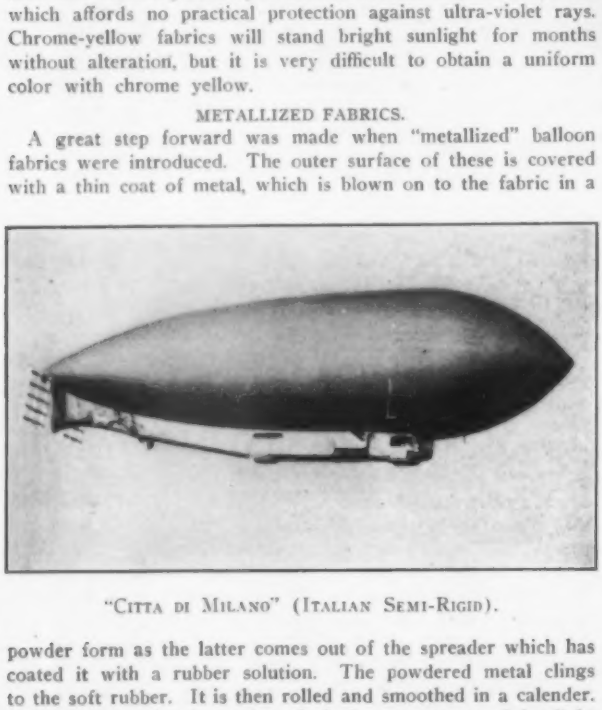
"PARSEVAL" (GERMAN NON-RIGID).

woven fabrics help to prevent the penetrating effect of light, but the yellow color is essential to save balloon fabrics from the ultra-violet rays and their destructive effects.

As sulphur combines easily with the chromate, it is difficult to vulcanize fabrics that are colored with lead chromate, the combination of lead and sulphur producing lead sulphide, which is black. This inconvenience is overcome by simply coating the colored layer of fabric with pure Para uncured and vulcanizing the rubber coating of the second layer of fabric which is placed underneath the colored one in making up the doubled fabric. It is also possible to vulcanize chromed-colored fabric by heat without seriously affecting its color, but great care must be exercised. Aniline yellow is also very sensitive to vulcanization, but it also can be easily handled. Unless treated with considerable care aniline yellow-dyed fabrics turn to a greenish yellow which affords no practical protection against ultra-violet rays. Chrome-yellow fabrics will stand bright sunlight for months without alteration, but it is very difficult to obtain a uniform color with chrome yellow.

METALLIZED FABRICS.

A great step forward was made when "metallized" balloon fabrics were introduced. The outer surface of these is covered with a thin coat of metal, which is blown on to the fabric in a

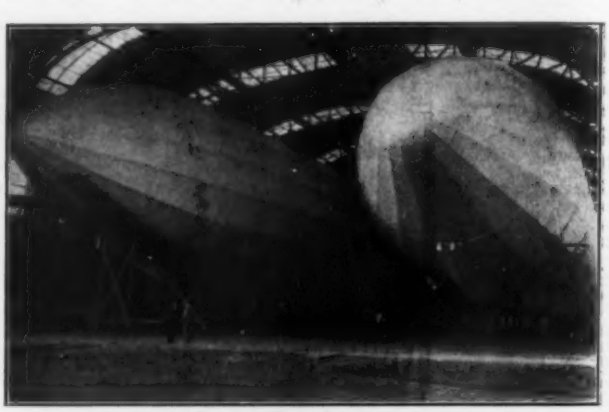


"CITTA DI MILANO" (ITALIAN SEMI-RIGID).

powder form as the latter comes out of the spreader which has coated it with a rubber solution. The powdered metal clings to the soft rubber. It is then rolled and smoothed in a calender. Aluminum powder is used exclusively on account of its light weight and the faculty it has of resisting the oxygen and the humidity of the air. Aluminum is not affected by sulphur or any of the other fillers usually employed in the manufacture of rubberized fabrics. Water runs off metallized balloon fabrics, which also throw off sunlight, destroying the action of both heat and of ultra-violet rays.

CHOICE OF RUBBER.

Only the best of crude rubber can be used for balloon fabrics and extra fine Pará hard cure is best of all. For this use the difference there is between fine Pará soft cure and fine Pará hard cure is of very great importance. The hard cure is obtained by more intense smoking and is easily recognized by the fact that its different layers are easily detachable from one another. Soft cure Pará comes in balls, the several layers of which it is very difficult to separate. Pará entrefine, Sernamby, negroheads, as well as African rubber, are not suitable for balloon fabrics. Well smoked plantation sheet rubber and Peruvian ball rubber can be used in part, but they must not exceed 40 per cent. of the total, and great care must be exercised in vulcanizing, for plantation as well as Peruvian rubber requires a greater addition of sulphur. A mixture of soft cure Pará or weak Pará, both irregular gums, or a mixture of resinous rubber would create difficulties in



ZEPPELINS IN THEIR SHED (RIGID).

vulcanizing and the gumming would turn to resin in a very short time.

VARIOUS MIXINGS.

The washing and drying of rubber for the manufacture of balloon fabrics does not present any peculiarities not known to rubber manufacturers. The same remark applies to the mixing. Mr. Churret, a French chemist, recommends the following compounds which have given good practical results:

	Kilos.	Pounds.
MIXTURE A, for making fabrics gas-tight:		
Fine Pará hard cure	4.000	8.8184
Paraffin (point of fusion 132.8 Fahrenheit)	0.030	0.0661
Sulphur (twice sifted)	0.400	0.8818
Calcinated magnesia (twice sifted)	0.110	0.2425
MIXTURE B, to increase the tensile strength of the fabric:		
Fine Pará hard cure	4.000	8.8184
Paraffin (fusion point 132.8 Fahrenheit)	0.040	0.0881
Carbonate of magnesia (Alba magnesia)	2.600	5.7319
Calcinated magnesia (twice sifted)	0.360	0.7936
Fine sulphur	0.400	0.8818
MIXTURE C, to obtain gas-proof fabrics by cold vulcanization:		
Fine Pará hard cure	4.000	8.8184
Paraffin (point of fusion 132.8 Fahrenheit)	0.500	0.1102

As these compounds must be dissolved after mixing, the following rules laid down by Mr. Churret should be followed:

"For mixing and massing, a mixer with cylinders about 1 meter (39.37 inches) will be used. The mixtures should never contain more than 8 kilograms (17.64 pounds) of rubber, and each of the ingredients should be weighed in clean containers.

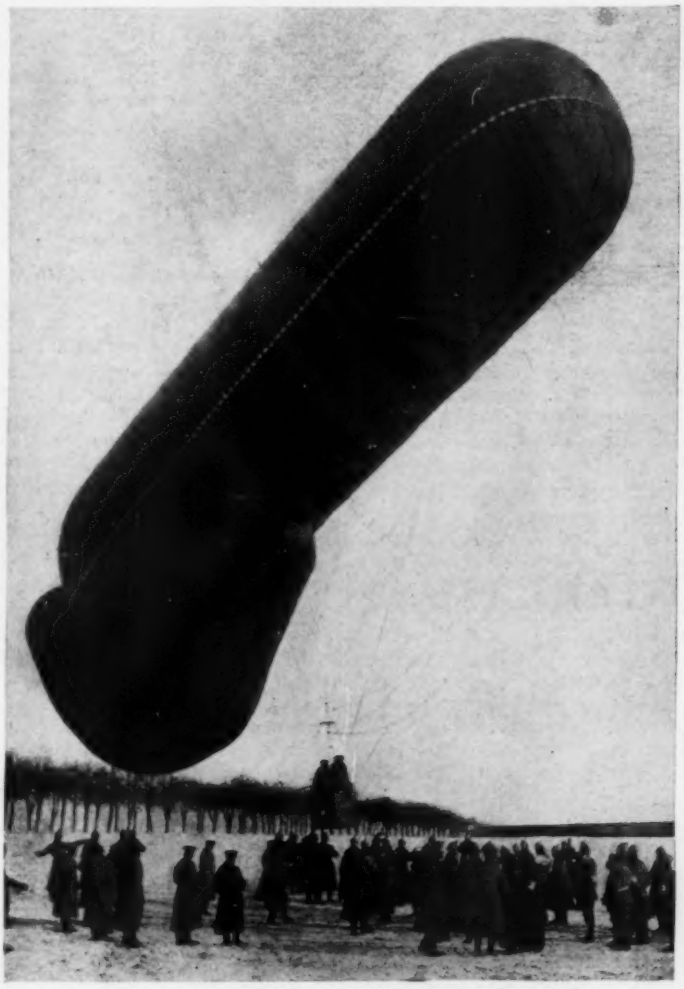
"For mixture A the Pará should be worked 1½ hours in the mixing machine, then the rubber is wound around a mandrel

and cooled. The cylinders also are cooled until they can be handled. The rubber is put back into the mixer and worked up again; the paraffin is then added by rubbing it on to the rear of the cylinder with the hand. When a perfect mixture is obtained it is again removed and allowed to cool for a half hour. The same process is followed in adding the sulphur and the magnesia.

"For mixture B the process is the same except that the magnesia and the magnesia carbonate are added at the same time. The magnesia must always be added before the sulphur, for it is very light and slow in mixing and the mixture becomes soft and very hot. Were the sulphur added while the mixture is hot it would be possible for vulcanization to commence in the mixing machine; the mixture must therefore be allowed to cool for at least an hour and a half before the sulphur is added.

"To spread the mass on the fabric it is of course necessary to dilute it. Either benzol or benzene may be used as a solvent, but the latter is preferable. The solution of benzene must be perfectly free of water and all the ingredients must be handled in perfectly clean vessels. The boiling point of the benzene must not be lower than 70° Centigrade (174° Fahrenheit) nor higher than 100° Centigrade (212° Fahrenheit). The part of the benzene that does not boil above 100° Centigrade must not exceed 8 per cent., for the table of the spreading machine would have to be too highly heated and, even then, the solvent might not be completely evaporated. This evaporation is very important, for the slightest bit of benzene would turn to gas during the vulcanization and make it impossible to obtain a gas-proof fabric. But the evaporation of the solvent must not be too rapid, for bubbles would possibly form and the finished material would not have sufficient strength to withstand the high gas pressure to which it is necessarily subjected when in use. The fabric must pass slowly over the heated table of the spreader to allow ample time for the complete evaporation of the solvent.

"The rubber mixture should always be dissolved slowly and should not be allowed to stand, lest the suphur should crystallize. The mixture is rolled into a thin sheet, which is shaken in the solvent, a perfect pulp being thus obtained. It is advisable to make two solutions of the same mixture—a 'long' or thin one and a 'short' or thick solution. The first application of the solution must penetrate the pores of the fabric as far as possible, and for this purpose a thin solution is better than a thick one. For lining the fabric the thick solution is best. In preparing the mixture it must be borne in mind that rubber is affected by the rolling it is subjected to; the more rubber is worked in the mixer the less its elasticity and the greater its adhesive qualities. Rubber is also differently affected by solvents. Rubber that has been kneaded a long time by warm cylinders requires less benzene than cold-rolled rubber.



GERMAN MILITARY CAPTIVE BALLOON.

SPREADING.

"The spreading must be performed in a room well ventilated and free from dust. The spreading machine must be established on a heavy, firm foundation and driven by cut gears, so as to eliminate vibration as far as possible and to obtain perfect regularity in running. Spreading cylinders should be perfectly smooth under the knife. The rubber coating must have a certain hardness. If it is too hard the fabric is compressed and weakened; on the other hand, if it is too soft, the fabric forces itself into the gum and the layer is consequently uneven in thickness.

"The knife of the spreading machine must be perfectly sharp in order that the layer of rubber may be well spread. If the rubber catches on the back of the knife and forms clots, they should be removed with a wet knife. This is very important. The table must be sufficiently heated to vaporize practically all the solvent by the time the fabric reaches the end of the table. Before spreading is begun the fabric must be perfectly dry. Coating begins with the spreading of the thin solution. The fabric is previously wound on a large drum, from which it passes on to a drum cylinder on which the spreading knife rests. The spreading knife is adjustable, so that one can obtain the desired thickness of coating. A fabric weighing 90 grams to the square meter (3.086 ounces to every 10.764 sq. feet) will take from 8 to 10 grams of gum per square yard. The layers of rubber coating are applied so as to follow each other in opposite directions. Longitudinal as well as transverse folds or wrinkles should be guarded against. The spreader moves at a speed of about 17 feet per minute. It is therefore easy to follow the work and correct mistakes. Bias fabrics which have a tendency to contract and shrink should be passed through a smoothing calender before spreading is undertaken. Fabric should also first be dried for 24 hours in a special room and sprinkled with paraffined talcum powder which can be rubbed into the fabric by a brushing machine.

(To be Continued.)

Rubber Substitutes and Their Analysis.

BEFORE reclaimed rubber came into vogue rubber substitutes were the only adulterants used in the European manufacture of rubber goods and even now their use has not been completely abandoned. The following paragraphs descriptive of different rubber substitutes are translated from a recent number of "Le Caoutchouc & la Gutta-Percha":

Rubber substitutes, as indicated by the name, closely resemble rubber, with which they can be mixed, in proportions of one to one, and even more, without materially affecting the elastic quality of the rubber. This is due to the curious mechanical consistency of rubber substitutes which, although they have no great tensile strength, have a high degree of elasticity. When substitutes are added to rubber the latter's strength is reduced, but there is no proportional lessening of its elasticity. Substitutes containing neither mineral oils nor wax and having a density varying between 0.98 and 1.020 are the only substitutes that can be used in combination with floating rubbers other than black rubber, and they are therefore of considerable interest.

White substitutes were discovered during the first half of last century and brown substitutes later on, and the manufacture of both has been perfected in the last decade. Rubber substitute is the result of the reaction of sulphur chloride at a moderate temperature—80 to 100 degrees Centigrade (176 to 212 degrees Fahrenheit)—or of sulphur at a higher temperature—160 to 200 degrees Centigrade (320 to 392 degrees Fahrenheit)—on crude or blown oil. Many features of the manufacture of rubber substitute resemble those of the manufacture of rubber itself.

Different oils are used, according to the market price, but best results are obtained with castor oil or rape oil. The reaction of sulphur chloride produces a slightly colored substitute commercially known as white substitute or white factice. Pure sulphur produces brown factice or brown substitute. When blown or oxidized oils are used the amount of the sulphur or of the sulphur chloride addition can be materially reduced, which is an advantage in white substitutes where high vulcanization temperatures injuriously affect the stability of the composition. The usual amount of sulphur does not exceed 6 or 7 per cent. for white substitutes, whereas brown substitutes can contain from 7 to 20 per cent. of sulphur. Cheap qualities of soft sulphur can be used only for strongly oxidized oils and produce quite different substitutes from those made with fine sulphur, which is generally used with crude oils.

Rubber substitutes are solid substances of about the same consistency as stiff jelly. They will not dissolve in rubber solvents, which will, however, swell the substitute into a light jelly. Although rubber substitutes are, as a rule, chemically inert, they are essentially saponifiable. Aqueous alkalis decompose rubber substitutes easily; alcoholic alkalis readily change them into glycerine and fatty acids that produce alkaline salts which are soluble in water. Brown substitutes are most generally used in compounds that are to be heat cured. White substitutes are used for cold cured articles and, in small quantities, in heat cured goods.

The normal composition of rubber substitutes is as follows:

1. Non-vulcanized fatty oils.
2. Free sulphur.
3. Rubber substitute properly so called, containing sulphur and chlorine.

Many brown substitutes also contain mixtures of paraffin and heavy petroleums. These are mixed with the oil before vulcanization and offer more than one advantage from a manufacturing point of view. Rubber manufacturers do not consider the adding of either paraffin or petroleum a fraudulent adulteration as long as they are advised of their presence in the substitute and of their percentage.

Brown substitute is sold commercially in compact cakes measuring 10 x 30 centimeters (4 x 11¾ inches). White substitute comes either in irregularly shaped amber colored pieces or in the form of a white powder of light consistency and having the appearance of bread crumbs.

It is important to note that the chemical composition of compact rubber substitute is not homogeneous but varies considerably from one point to another. For this reason the analysis of a shipment cannot be determined by analyzing a small fragment of it; at least a pound must be taken and worked cold in a mixing mill or calender.

ANALYSIS OF RUBBER SUBSTITUTES.

Two grams of substitute are placed in a funnel filter on top of purified cotton and are extracted with acetone during 10 hours in a Saxhlet or in a Knoffler extractor. The extract is then dried at 100 degrees Centigrade (230 degrees Fahrenheit). It contains:

1. Non-vulcanized oil.
2. Non-saponifiable substances.
3. Free sulphur.

The presence of paraffin is characterized by its crystallization in the acetone; the presence of mineral oil by its fluorescence.

Non-vulcanized oils are only slightly soluble in acetone and often settle in heavy drops. This product is not composed of non-modified fatty oils, for they always contain from one to two per cent. of combined sulphur. However, it is really oil, very distinct from the substitute that is a gelatinous solid, so that the designation "non-vulcanized oil" is not a misnomer.

DETERMINATION OF SULPHUR.

For this purpose one of the methods for determining the proportion of sulphur in vulcanized rubber can be used. The most expeditious method is to treat the extracted acetone with sulphur-saturated petroleum, but this system can only be adopted where there are large quantities of sulphur and when the crystals have settled. The Davis and Fouchard process gives very exact results where there are small or even large quantities of sulphur, but this process is not reliable where there is chlorine, as in white substitutes. The method by oxidation presents the disadvantage that the small quantity of combined sulphur that is in the substitute is also oxidized and the figure representing free sulphur in this manner slightly increased. Large quantities of sulphur denote defective preparation of the substitute. White substitute generally contains from one to two per cent. and sometimes more free sulphur that is produced by the reaction of the sulphur chloride on the oil. The presence of free sulphur may also be due to a reversion of the substitute after its manufacture.

PROPORTION OF NON-SAPONIFIABLE SUBSTANCES.

The proportion of non-saponifiable substances is determined by treating the acetone extract of 2 grams of substitute, the extract being boiled for two hours with 40 c.c. of normal alcoholic potash.

The subsequent treatment varies according to the kind of non-saponifiable substance. This is easily discovered by cooling the alcoholic potash or by diluting it with water. When the non-saponifiable part is liquid, like vaseline or mineral oil, the alcohol should be distilled, the residue taken up with water and extracted twice or even three times with ether, the ether extract decanted, evaporated, dried at 110 degrees Centigrade (230 degrees Fahrenheit) and weighed. If the non-saponifiable part is solid, like paraffin or ceresin, or extracted by petroleum ether, the alcoholic liquid is not evaporated, but an equal volume of water is added and then extraction

is performed by using petroleum ether. Aqueous alkaline solutions or slightly alcoholic solutions cannot easily be extracted with petroleum ether on account of the formation of persistent emulsions. The petroleum solution is separated, then washed, first with a small quantity of concentrated sulphuric acid, then with a solution of one-half normal alcoholic potash, and finally it is evaporated and dried in the usual manner.

PROPORTION OF NON-VULCANIZED OIL.

After the free sulphur and the non-saponifiable substances are removed from the acetone extract, the non-vulcanized oil is obtained. The residue that is non-soluble in acetone is vulcanized oil or factice.

DETERMINATION OF SULPHUR AND CHLORINE COMBINED.

To determine the proportion of sulphur and of chlorine combined from .5 gram to 1 gram of brown factice is taken from the acetone extraction residue and treated according to the method of Henriquez or according to that of Pontio. The substance is slowly heated in an iron retort with 10 grams of caustic soda and 10 per cent. of alcohol. This causes the factice to dissolve. The solvent is then slowly evaporated, one liter of water added and the whole strongly heated while it is constantly being stirred. The organic matter is heated until it smokes and thickens into a magma that shows a tendency at some points to become incandescent. Then peroxide of sodium is slowly and progressively added in small portions with a spatula while the stirring is continued.

As the peroxide is added the liquid becomes more and more fluid and finally becomes black through the formation of ferrates. Care must be taken to divide the peroxide so that it will be thoroughly mixed with the mass and will thus produce uniform oxidation. The mass is then cooled and treated with water. If there is no chlorine the solution is acidified with hydrochloric acid, boiled and precipitated by chloride of barium. Where there is chlorine, the solution is divided into two parts, which are acidified, one with hydrochloric acid, the other with nitric acid, and the sulphur contents determined with barium chloride and the chlorine by nitrate of silver.

DETERMINATION OF TOTAL SULPHUR, MOISTURE, FREE ACID AND ASH.

The total sulphur can be determined by one of the usual methods applied to the original substitute. The combined sulphur is always found rather low in brown substitutes.

Moisture is rarely determined in brown substitute. When the decomposition of white substitute is rather advanced, it contains a small percentage of moisture. It may be determined by drying at 60 degrees Centigrade (140 degrees Fahrenheit).

There is always free acid in rubber substitutes, but the amount rarely exceeds 2 per cent., figured as oleic acid. It is rather harmless or not more troublesome than non-vulcanized oil. In substitutes that are in a state of decomposition free sulphuric acid is often found and it can be determined by washing the substitute in hot water and by titrating the sulphuric acid in the wash water by barium chloride.

Ash amounts to about 1 per cent. in brown substitutes and is of no importance. In manufacturing white substitute a little lime or magnesia is often added to neutralize the hydrochloric acid created during decompoistion.

The proportion of ash in white substitute is not generally determined quantitively, but only examined qualitively.

The following figures, quoted from "Le Caoutchouc & la Gutta-Percha," are for typical rubber substitutes:

WHITE SUBSTITUTE.

	English	German	French
Non-vulcanized oil ..... *per cent.*	10.3	7.7	13.8
Free sulphur	0.8	0.3	2.1
Vulcanized oil (by difference).....	86.2	89.4	81.3
Combined sulphur (in the extracted factice).....	6.7	7.2	6.4
Chlorine	7.8	7.7	7.2
Ash	1.0	2.6	2.8

BROWN SUBSTITUTES WITHOUT HYDROCARBONS.

	English	German		French
	Hard	Hard	Medium	Soft	Medium
Non-vulcanized oil.....*per cent.*	21.7	9.6	22.7	17.2	23.6
Free sulphur	0.3	0.1	0.2	0.1	1.5
Vulcanized oil	77.1	90.2	77.0	82.5	74.3
Combined sulphur	13.1	16.3	7.1	10.2	9.8
Ash	0.9	0.1	0.1	0.1	0.6

BROWN SUBSTITUTES CONTAINING HYDROCARBONS.

	English	German	Fine German	Para French
Non-vulcanized oil.....*per cent.*	25.1	10.6	25.0	23.4
Free sulphur	2.5	1.6	0.5	0.4
Paraffin.....	20.1	...	21.3	25.2
Mineral oil	...	23.1	...	...
Vulcanized oil	51.3	64.6	52.5	47.9
Combined sulphur	13.8	13.5	3.6	3.1
Ash	0.1	0.1	0.7	0.1

In general the best substitute is the one that contains the least non-vulcanized oil because the effect of this oil is the same as if the oil were simply mixed with the rubber, that is, it lessens the life of the rubber. Mineral oils are less dangerous, in this connection, than vegetable oils, and paraffin is entirely neutral.

For mixing rubber with the above substitutes, the following proportions may be adopted: Thirty parts of French Para, substitute may be added to 100 per cent. of rubber, with 8 or 9 per cent. of paraffin. As a matter of fact paraffin can be even used in a greater proportion.

The proportion of ash in a substitute must not exceed reasonable limits, 4 per cent. for instance, and should contain more of magnesia than of lime. Magnesia, with a little oil, produces a non-deliquescent oxichloride. The presence of hygroscopic substances causes rubber substitutes to decompose while in storage.

To recapitulate, the best substitutes are those that, in their crude state, are driest and least coherent, the sulphur and chlorine together not exceeding 20 per cent.

Brown substitutes, and sometimes white substitutes, offer a great variety of mechanical consistencies, according to the ratio of non-vulcanized and non-saponifiable ingredients to the combined sulphur. The low vulcanization of these qualities makes soft products that are sticky and gelatinous. Well vulcanized, on the contrary, they are firm and strong. These properties are of the greatest importance in determining the substitute to be used in a given mixture.

Substitutes as received should be extracted with acetone to determine the free sulphur and the non-saponifiable parts. Rubber substitutes of the same make should not vary greatly in consistency, and the percentage of extract should remain constant in the neighborhood of 2 per cent. The mechanical properties of substitutes of different makes can only approximately be determined by analysis. For instance, two samples, made of different oils, may give the same acetonic extracts and the same percentage of combined sulphur and yet be very different. In such cases mixing and vulcanization tests should be made.

The knowledge of the percentage of free sulphur is important for figuring compounds. More than 3 per cent. denotes either defective manufacture or reversion while in storage.

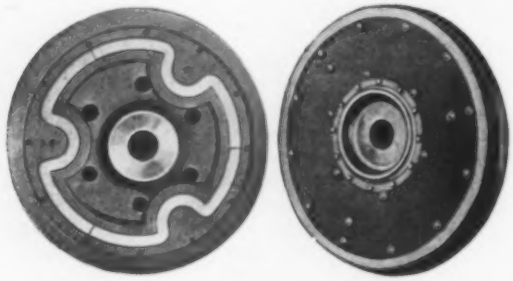
Methods for analyzing oils are applicable only to a slight extent to rubber substitutes, and the indications they give concerning the raw materials used are misleading and of little interest to the rubber manufacturer.

The figures representing saponification in substitutes are always higher than those for oils, and are not constant unless rigorous methods are employed. They are in the neighborhood of 300 for white substitute and 100 for the brown. The proportions of fatty acids play an important part in the general analysis of rubber.

New Rubber Goods in the Market.

RUBBER IN CAR WHEELS.

THE introduction of rubber into car wheel construction opens a field of interesting possibilities to the rubber manufacturers. Such a wheel has not only been designed and patented, but has been in use since early in April and is said to have substantiated the claims of the inventor for the elimination of the rattle and jar of the car This Madden Silent Wheel is constructed on the principle of a wheel within a wheel, the curved recesses preventing the inner wheel from revolving except as the outer one revolves. The two wheels are separated by a rubber cushion, as shown in the white curved line in the interior view of the wheel, the other view showing the wheel with side plates attached to hold the inner wheel in position and prevent side motion.



The wheel itself is designed to give 300,000 miles service, and the rubber inner tire or cushion, as well as the outer wheel tread, can be replaced when worn out. The wheels at present in use have already run over 7,000 miles, and they are still running in test service. The makers believe that the rubber cushion can be greatly improved, and they invite the co-operation of rubber manufacturers toward this end. As 26 pounds of rubber is used in each wheel, with eight wheels to a car, and as there are in use in the United States at the present time about 100,000 trolley cars and 60,000 railway passenger cars, besides about 2,500,000 freight cars—for all of which this wheel is adapted—its adoption by the street and steam railways throughout the country would mean a great increase in rubber consumption. [Madden Silent Wheel Corporation, 1180 Broadway, New York.]

THE ANGLE-TREAD NON-SKID TIRE.

The usual procedure in tire manufacture in the past has been to have the non-skid portion of the tread run about half way down over the side walls, beyond the point where it comes in contact with the road. The illustration shows a type of tire in which this custom is not followed, but where the tread is made higher in the center, where the tire is subjected to the most wear. This feature, and a scientific arrangement of the corrugations, are supposed to add considerably to the tire's wearing qualities. [The Marathon Tire & Rubber Co., Cuyahoga Falls, Ohio.]

In the new "Crazy Cab" adjustable and detachable stormproof top designed for the Ford runabout, the curtains are of heavy rubber-covered sail duck. [Fouts & Hunter Co., Terre Haute, Indiana.]

"INDESTRUCTIBLE" GASOLENE HOSE.

The cut below, a photographic reproduction of a section of a new type of "Indestructible" hose, tells its own story. The manufacturers of this hose are guaranteeing it to withstand the action of gasolene and oil and offer to replace it without

charge if it becomes unserviceable from the action of gasolene; and the hose is so branded, the guarantee providing, however, that it must not be used for any other purpose than conveying gasolene and oil. [New York Belting & Packing Co., New York.]

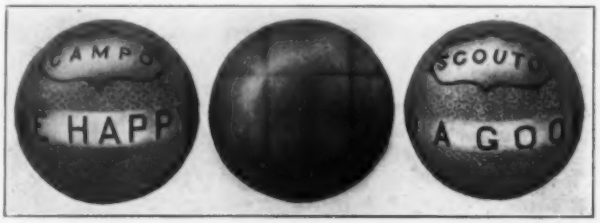
THE "BESTYETTE" WATER BOTTLE.

This is a seamless, narrow-neck bottle, made of tough and durable rubber stock over a solid core. The stopper is integral with the bottle and is not wired to the neck or held in place by a piece of friction tape, but is really part of the article itself.

The unusual qualities claimed for this bottle by the manufacturer are demonstrated by a series of novel tests. The bottle is inflated until it is five times its normal size, subjected to an air pressure of forty pounds; then two men stand on the inflated bottle, which stands this severe test without rupture or break. The illustration was made from a photograph of a "Bestyette" bottle taken after being subjected to the above mentioned tests. It will be seen that it retains its uniformity and has not lost its shape. [N. Y. Mackintosh Co., Mamaroneck, New York.]

NEW RUBBER BALLS.

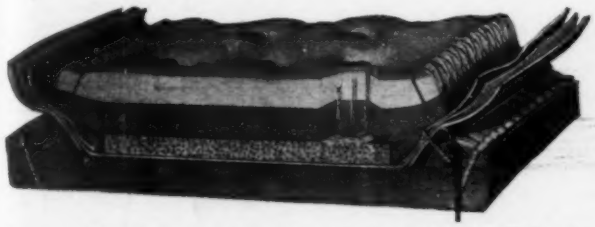
The cut below illustrates three balls that have just come on the market, although the design of two of them, the "Campo" and the "Scouto," was mentioned on page 194 of our January issue. These two balls, as their names imply, were designed for use by the Camp Fire Girls and the Boy Scouts, two very popular



organizations whose membership now includes a large number of the young people throughout the country. On the Campo ball, the words "Be Happy. Give Service"—two of the seven parts of the club law—appear in raised letters on a band around the center of the ball; on the Scouto are the words "Do a Good Turn Daily." The blanket ball in the center is in bright colors in plaid effect. [Goodyear Rubber Co., Milwaukee, Wisconsin.]

A NEW TYPE OF WATERPROOF SHOE.

The "Dry-Sox" is a new line of shoes in which the waterproof effect is produced in a novel manner. The illustration shows the part that rubber plays in its make-up, a rubber welt being sewed in with the leather welt to prevent water



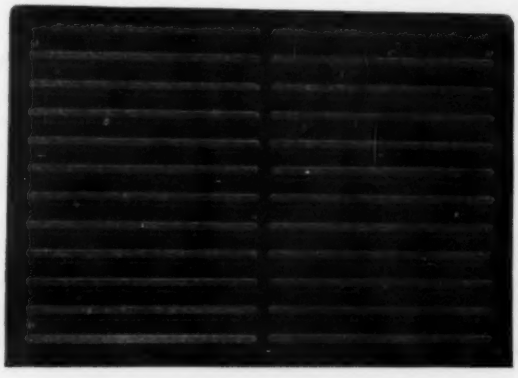
from getting between the welt and the out-sole. This, the manufacturers claim, makes as waterproof a leather shoe as it is possible to produce. [F. Mayer Boot & Shoe Co., Milwaukee, Wisconsin.]

A RUBBER DENTAL BLOCK.

The best filing surface in dressing a vulcanite denture is a cushion of soft rubber, and the cut herewith shows an improved dental block which consists of a cast-iron frame and a rubber block that has just the slight give which permits of easy and accurate filing. The rubber blocks, which are made in two sizes to fit different-sized frames, are readily replaced when worn out. [The S. S. White Dental Manufacturing Co., Philadelphia.]

STEP PLATE WITH RUBBER STRIPS.

The Stanwood Safety Step Plate is a new device composed of a series of semi-pliable rubber segments inserted in an embossed metal plate covered with a baked-on enamel in imitation of gray rubber. The rubber segments project one-



eighth of an inch above the perforated containing plate and can be replaced in the event of damage or when worn. The step, besides insuring a firm foothold, prevents the tracking of mud and water into the car. [Automatic Appliance Co., Boston.]

THE MOTORCYCLE TIRE WITH THE BLUE STREAK.

As the motorcycle is being constructed for a wider range of usefulness than in the past, there is naturally a call for better tires, and the "Blue Streak" tire, made with a distinguishing blue circle around the center, has been produced to meet this demand. The blocks on the tread are bigger, come up farther on the side, giving better traction and wear, and the carcass has four plies of fabric and a breaker strip—practically placing it in the automobile tire class. The heavy tread blocks not only make the tire attractive but so overlap each other as to permit a flat and regular tread and on rough roads serve as a protection against cuts and punctures. [The Goodyear Tire & Rubber Co., Akron, Ohio.]

RUBBER IN THE "AERO-PHONE."

The rush of the wind and the deafening roar of the propeller discourage conversation between the pilot and the passenger in an aeroplane, and a special telephone equipment is required to make such conversation possible. This apparatus is called an "Aero-phone" and consists of two double-head telephone receivers and two special types of chest transmitters. The receivers, which are of hard rubber, are held against the ears by a spring head band so that practically all the disturbing noises are excluded. The special transmitters are provided with soft rubber caps and are strapped to the chest at a point below the collar-bone and above the third rib. In speaking, the chest muscles transmit the voice vibrations to the transmitter.

The receivers and transmitters are connected by suitable cords which terminate in a small plug, the plug being inserted in a jack mounted in the frame-work of the aeroplane. One of these jacks is provided for each occupant. The battery required consists of three standard telephone dry batteries, which will provide continuous service for 100 hours.

The simplicity and efficiency of this apparatus especially adapt it to use in the military branch of aerial work, where it is essential that aviator and passenger be in communication at all times. [Western Electric Co., New York.]

A NEW USE FOR THE RUBBER BAND

An inexpensive card case for the vest pocket is made effective for holding a dozen or fifteen cards by means of a simple flat rubber band. One cover is lined with cardboard folded to fit the back of the covers and returning as a narrow flap to bear upon the cards, the power to hold which is obtained by an encircling rubber band.

NEW "CRAVENNETTE" MATERIALS AND STYLES

A new knitted fabric called "Knitabac" is being offered, in numerous weights and colorings, for ladies', misses' and children's sport coats and suits and for general utility wear. It is cravenette proofed, and among the claims for superiority over other materials in similar use are that it repels moisture but does not induce perspiration or stop ventilation, and that it maintains warmth to an extent equal to double its weight in other fabrics. The sport coat illustrated is made of this new material. [French & Ward, 79-81 Worth street, New York.]

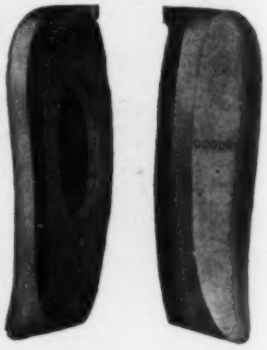
"KAMP-IT"

The "Duxbak" brand of special woven cravenetted camping and sports clothing has been familiar for a number of years to sportsmen and campers-out. This season the makers have brought out a new material of lighter weight, called "Kamp-It," in which some unusually attractive garments for both women and men are being offered. This material is made of specially woven cotton and is cheaper than Duxbak, the rain-resisting qualities of which it also lacks. In ladies' garments the manufacturers are showing new styles in riding breeches or bloomers, also a new riding coat.

The lower illustration shows a new style in a trap shooter's jacket. It has the English pivot sleeve, expansion back and capacious shell pockets supported by plaits extending over the shoulders. [Bird, Jones & Kenyon, Utica, New York.]

GUN RECOIL PADS.

Rubber has relieved the hunter and the trapshooter from the lame shoulders that before the introduction of the recoil pad were the frequent result of recoil shock, and it has increased their accuracy of aim by eliminating flinching. It is the best absorber of gun shock known, and various forms of pads have been placed on the market, of which those illustrated herewith are the most recent.



The first cut shows two views of the improved H. R. B. pad. This pad has a soft face of high grade rubber, curved to fit the shoulder. It has a tough, durable base of hard rubber, inseparately connected with the soft rubber part by a special strip. The oval air chamber through the hard rubber base is continued, in enlarged size, into the soft rubber part, extending about half way through the pad and under practically the entire surface of the soft rubber cushion. The extent of this air chamber is supposed to give the pad unusual shock absorbing qualities. It is made in three sizes and can be buffed to fit any butt. [The B. F. Goodrich Co., Akron, Ohio.]

The Perkins shock absorber, on the left, is made of soft red rubber, and is joined to the gun or rifle by rubber cement and screws, as illustrated. This pad can be bent in any shape to fit any gun and is claimed to be the only pad on the market that can be extended and contracted. It is neat in appearance, three-quarters of an inch thick, and is made in six sizes. [John W. Perkins, Everett, Massachusetts.]

The Anti-Flinch recoil pad, which is made by the Jostam Manufacturing Co., of Chicago, is a molded soft rubber cushion vulcanized to a hard rubber base plate. Through the soft cushion are oblong holes slanting at an angle of 45 degrees in line with the stock. Between these holes there are walls of rubber that fold each on the other when the gun is discharged and spring back into normal position when the pressure is released, thus taking up the recoil. These walls of rubber are further supposed to eliminate the upward whip of the muzzle at the time of discharge and to maintain balance of the gun for second shot. [Hibbard, Spencer, Bartlett & Co., Chicago.]

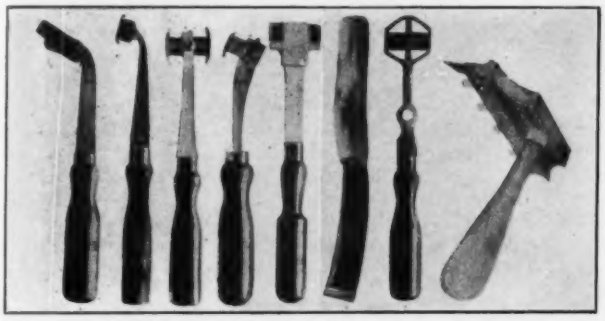
The Huntley shock absorber was designed by S. A. Huntley, one of the best shots in the country, whose record has gained considerably through its use. It is composed of layers of high grade sponge rubber with sheets of gasket rubber between, the object of this particular construction being to absorb the shock through the consistency of the sponge rubber, without the quick rebound that the pure rubber pad gives. The gasket rubber on the outside, next the shoulder, adds to its durability. It is made in two sizes and at prices varying with the number of layers in the pad. [The Huntley Manufacturing Co., Omaha, Nebraska.]

"Holdtite," a new puncture and blow-out patch, is made with a coating of cement which increases in adhesive strength as the tire becomes heated by friction. This patch is also constructed with a special canvas backing to prevent it from stretching and to hold the edges of the cut closer together. [The Surridge Holdtite Patch Co., Grand Rapids, Michigan.]

The Editor's Book Table.

A HANDBOOK OF TROPICAL GARDENING AND PLANTING. BY H. F. Macmillan, F.L.S., F.R.H.S., Superintendent Royal Botanic Gardens, Ceylon. Illustrated. Second Edition, 1914. Ceylon, H. W. Cave & Co. [Cloth, 8vo., 662 pages.]

THE author is an authority of highest rank in matters pertaining to tropical agriculture and in this work presents a well-arranged compilation of reliable information of much interest and value. The chapters are grouped in four sections. Section 1 covers general conditions of climate, soils, manures, propagation, cultural operations, plans, implements and tools. Section 2 discusses the fruit and vegetable varieties, spices, etc. Section 3 is devoted to tropical flowering plants and foliage trees, many of which are of unusual beauty and interest. Section 4 deals with the standard economic vegetable products of Ceylon, principal among them being rubber, tea, cocoanuts, cocoa, rice and tobacco.



SOME TAPPING KNIVES IN USE.

It may be of interest to condense from the chapter devoted to rubber which gives in detail all the essentials regarding the usual methods or systems of tapping. The various knives and pricking tools which are used for making incisions of the bark are illustrated. Different systems of tapping are employed because some are better adapted than others to certain species and to trees of different ages. Nearly all are on the system known as "herring-bone" or "half-herring-bone." The latter sometimes is called the "half-spiral" system. In the case of the *Hevea* tree the usual method is to mark the circumference of the stem, up to about five feet from the base, into quarters. One quarter at a time or alternate quarters on reverse sides may be operated on simultaneously. This area is marked off usually with two wide V's cut about a foot apart vertically, and joined by a vertical central channel. A thin shaving, not less than 20 to the inch, is taken off the lower side of each cut every alternate day or so until the intervening space of bark becomes too narrow or exhausted of latex, when the operation may be repeated on a fresh quarter of the stem. The tapping may thus be extended over almost the whole year. Each succeeding year the opposite or adjacent quarter may be operated upon, the whole area thus occupying from four to six years, by which time the renewed bark on the first quarter should be ready for retapping. The special forms of knives used are designed to prevent the incisions from penetrating the cambium layer and thus producing a knotted condition of the stem. If the cambium be much injured the life of the tree will be affected.

The process of coagulation of the latex is usually accelerated by addition of a little more than one per cent. of acetic acid. The rubber quickly forms as a wet floating mass and is removed for machine washing and making into the commercial forms of crêpe, sheet or block. Smoke curing on plantations is at present in an experimental stage.

The rubber producing trees, shrubs and climbers are described and botanically catalogued and much information is given concerning the principal species.

The work concludes with chapters on miscellaneous products, insect pests, fungus diseases, etc. The author has rendered an important service in the preparation of this handbook which is more valuable by the inclusion of a good index.

RUBBER INSULATED WIRE. By DRS. BENZ AND FRANK. PUBlished by the Union Deutsche Verlagsgesellschaft, Berlin, Germany. [8vo, 58 pages, 47 illustrations, paper bound.]

This is an interesting monograph on the manufacture and applications of insulated wires and cables. After giving a brief history of the use of rubber and gutta percha for insulating wire, it describes chronologically the whole process of manufacture of rubber and gutta percha insulated wires and cables, the preparation of the raw materials, the impregnating of fabrics, insulating mixtures; the machinery used in cable factories for insulating both wire and cable; wrapping machines, insulating machines, longitudinal cable rolling mills, etc.; the finishing and testing of rubber and of gutta percha insulated wires and cables, and the manufacture of Okonite and other insulating materials containing either rubber or gutta percha. This joint production of Messrs Benz and Frank should prove a valuable book of reference to all interested in cables and insulated wire. The text is in German.

PURCHASING. BY C. S. RINDSFOOS, C.E., PRESIDENT OF THE United States Purchasing Corporation. McGraw-Hill Book Co., New York. 1915. [Cloth, 8vo, 165 pages. $2 net.]

Hitherto there has been no literature dealing adequately with the important subject of purchasing, considered in its fundamental relations. This concise text book gives a clear presentation of the author's views based on his practical experience and comprehensive study of the problem.

The subject is treated topically in ten chapters, beginning with how to obtain the right article and the importance of special knowledge relating to its use, supply and manufacture. The matter of aiming at the lowest price calls for use of competitive bids treated under various methods of tabulation and analysis. Prompt delivery, emergency orders and expecting the impossible, and the value of the perpetual inventory are naturally grouped for discussion. A brief chapter discusses making purchases conform to a fixed policy. This is followed by chapters on Securing Favorable Terms; Personal Characteristics and Qualifications; Strategy; Legal Aspects, and Departmental Organization; concluding with a chapter of forms.

The gist of nearly every chapter is briefly and conveniently summarized.

Purchasing agents who study this book as it deserves can not fail to be benefited by the intelligent views and practical methods advocated by the author.

INVESTOR'S BLUE BOOK FOR 1915. EDITED BY GEORGE J. Holmes. The "Money Market Review and Investor's Chronicle" offices, London. [Boards, 408 pages; price, 5 shillings net.]

The object of this work is to give, in convenient form, all the essential details concerning 1,700 important corporations and the 7,500 securities which are quoted on the London and provincial exchanges, and in addition, the editor's opinion regarding these various companies and securities. This information is arranged upon a uniform plan, and in alphabetical order by companies.

An attempt is made to forecast the effect of the European war on the yield of securities. The British Government, it is considered, will be borrowing on a 4 per cent. basis, sound indus-

trials may then be expected to yield 6 per cent. and rubber shares 10 per cent., owing to expanding outputs and declining costs, despite a reduced selling price of the product. The editor treats the topic of the balance sheet analytically as a virtual prospectus to be viewed in that light by the prospective investor. The section on "Selecting a New Issue," contains much sound advice and information. Under the statement concerning the affairs of each company is found an opinion summing up the investment value of the shares. These opinions are valuable and evidently are unprejudiced and independent. The book is in three alphabetical sections, treating, in order, Government and Municipal Issues, Joint Stock Companies and Securities Classified.

The book easily ranks as the most complete and authoritative work of its kind.

RUBBER FACTS AND FIGURES, NO. 12. JUNE, 1915. COMPILED by Frederic C. Mathieson & Co., 16 Copthall avenue, London, E. C. [Paper, 135 pages; price, one shilling net.]

This compact arrangement of tables presents in convenient form the essential facts and figures relating to rubber plantations under English control. Especial attention is directed to the reduction in costs of production since the last compilation and the expectation of the planters that these will be still further lowered this year. This will be brought about by improvements in management and field methods. Most companies are now thinning out trees, as with increase of size a smaller number of trees to the acre produce as much rubber as a larger number and permit a saving in tapping. In 1913 the exportation of plantation Pará nearly equaled that of all wild grade via Pará, and in 1914 surpassed the latter's exports by 14,000 tons. The book is of convenient pocket size and well adapted for reference.

NEW TRADE PUBLICATIONS.

"THE CARE AND REPAIR OF TIRES" is the title of a valuable handbook published by the Firestone Tire and Rubber Co., of Akron, Ohio, for the benefit of the pocket-books of automobile owners. The object of the Firestone booklet is to educate motorists to eliminate unnecessary tire expense by telling them certain things they should know about the tires they use. Good tires will stand abuse, but there is a limit to their capacity to do so and motorists who will carefully read the instructions contained in "The Care and Repair of Tires" should easily be able to materially reduce their tire bills.

RUBBER AND GUTTA PERCHA MANUFACTURE.

The India Rubber, Gutta Percha & Telegraph Works Co., Limited, of Silvertown, London, has published for distribution a finely printed book of 34 pages containing well selected historical data concerning the origin and growth of the company, which began manufacturing in Greenwich in 1852. The departments mentioned are rubber, gutta percha, submarine cable, electrical, mechanical and testing. Much interesting technical information is to be found in the account of the manufacturing operations described, particularly that relating to cord motor tires, golf balls, submarine cable making and laying, instruments for electrical testing and operation of cables. The book is well illustrated, and some of the views show unique machines and applications. An appended list of the company's manufactures includes practically everything in rubber except shoes, clothing and druggists' sundries; certainly everything in gutta percha, and much in electrical instruments, machinery and electrical accessories.

PUBLICATIONS OF UNITED STATES BUREAU OF STANDARDS.

TESTING AND PROPERTIES OF TEXTILE MATERIALS.—Circular No 41. This is an account of the standard methods of testing raw and unspun fibers, yarn, thread, twine and fabrics, concluding with general instructions regarding applications for tests and the schedule of fees. It is a pamphlet of 16 pages.

ELECTRIC WIRE AND CABLE TERMINOLOGY.—Circular No. 37. This pamphlet contains the definitions of terms used in the nomenclature of electric wires and cables, illustrated with views of cable sections. Stranding receives special attention. An illustrative discussion introduces the terms defined and shows their proper use in the context.

THE TESTING OF RUBBER GOODS.—Circular No. 30. This is a third edition of the pamphlet entitled "The Testing of Rubber Goods." The new edition of this valuable publication of the Department of Commerce is double the size of the preceding edition. The physical and chemical sections include the Bureau of Standards' methods, fully detailed and illustrated. The book should be in the hands of every engineer of tests and every chemist who is concerned with the valuation of rubber goods. Copies are obtainable from the Superintendent of Documents, Government Printing Office, Washington, D. C., at 15 cents per copy.

CAOUTCHOUC.

The La Crosse Rubber Mills Co., of La Crosse, Wisconsin, has issued for advertising purposes a very attractive brochure entitled "Caoutchouc—The Story of the Manufacture of Rubber Footwear."

It is a well written account, profusely illustrated with selected views showing in systematic progression the manufacture of rubber from forest to the finished rubber footwear. In connection with the text the book gives a very clear presentation of an important branch of rubber manufacture of great popular interest. It is full of information, and has a genuine educational value for the general public. Presumably the book is for free distribution on application.

COMMERCIAL TREATIES OF THE UNITED STATES.

The National Trade Council, with headquarters in New York, has an authorized maximum membership of 50 merchants, manufacturers, railroad and steamship men and bankers, representing all sections of the United States and collectively standing for the general interests of all elements engaged in foreign trade. Samuel P. Colt, president of the United States Rubber Co., and Maurice Coster, foreign manager of the Westinghouse Electric & Manufacturing Co., are included in the list of members.

In anticipation of the responsibilities which will fall upon the United States when the world begins to repair the treaty relations destroyed or dislocated by war, the Foreign Relations Committee of the National Foreign Trade Council has caused to by prepared by Carman F. Randolph, of the New York Bar, a compact "Brief on Commercial Treaties of the United States." The brief lists and discusses the commercial treaties in force between the United States and other nations, and in an appendix embodies those provisions of existing treaties relating to commerce.

ELECTROLYTIC INSULATION OF ALUMINUM WIRE.

In a paper recently read before the American Electro-Chemical Society, C. E. Skinner and L. W. Chubb describe a process for the production of an insulating film of high dielectric resistance on the surface of aluminum wire. The best electrolites are solutions of borax, borate of aluminum, and above all, sodium silicate. The coating obtained with the latter material has a dielectric resistance much greater than that of the coating of oxide obtained by other processes. Two wires so treated and tightly twisted together withstand a pressure of 200 to 500 volts.

The Draper-Maynard Co., of Plymouth, New Hampshire, has ready for distribution its illustrated catalog of athletic goods for the 1915-1916 season, as well as a new 40-page booklet giving the official football, basket ball and soccer football laws for the season, with illustrations of outfits. These rule books are for general distribution and may be obtained from dealers or from the company's offices direct. Similar rule books covering baseball and tennis are published about the first of January.

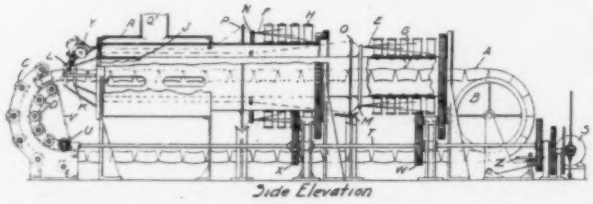
New Machines and Appliances.

MACHINE FOR MAKING HOSE OR TIRE CASING STRIPS.

THREE patents have recently been granted to John T. Lister for improvements in the method and machinery for making fabric tubes and strips from rubberized cords. The first invention covers a method of making strips of hose and tire-forming fabric; the second covers a tire strip, and the third covers the apparatus for making the hose and tire fabric, which is herewith illustrated and described.

In the illustration, which is a side elevation of the machine, parts are shown in section and others are broken away to more clearly show the details. The machine is supported on standards on which are mounted or journaled the operative parts. *A* is the movable core about which are wound the groups of rubberized cords forming superimposed spiral layers, arranged at different angles to each other. The endless chain of core sections forming the core passes around the pulley *B* and between an inner and outer series of rollers *D* and *C* respectively, at the front of the machine. This endless chain also passes through the two hollow cylinders that revolve in opposite directions supported by the machine frames and standards.

The groups of cord *E* that form the inner layer of the strip are carried on spools *G*, which are fixed to the cylinder *I*. The outer layer is formed by the groups of cords *F* carried on spools *H*, attached to the forward cylinder *J*. The cords are rubberized by being passed through cement chambers *M* and *N*, and then through annular guides *O* and *P* to the annular winders *K* and *L*. Here they are wound spirally in opposite directions on the



Side Elevation

endless moving core. To unite the layers of cord a strip of rubber stock is laid between them by the roller *Y*. The rubberized cords are dried as they pass through the drying chamber *R* by a current of air drawn through the pipe *Q*.

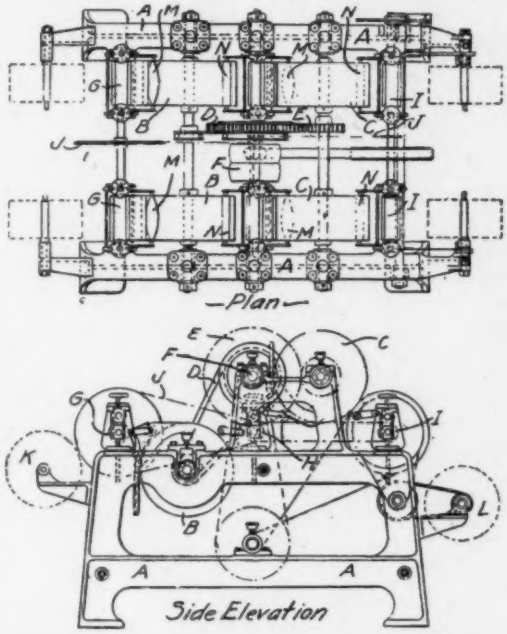
The machine is operated from a motor *S* connected by gearing to the main shaft *T* which drives the cylinders in opposite directions through spur gearing *W* and *X*. At the forward end of the main shaft is keyed a bevel gear that drives a cross shaft *U*. Attached to this shaft is a sprocket wheel and a chain belt *V* which drives the friction rollers *D* that in turn drive the moving core *A*. Fixed to the shaft *U* is a rotary cutter that slits the fabric tube so that it can be removed from the core in the form of an open strip suitable for building up tire casings. The tension of the core chain is adjusted by a lever and hand screw *Z*. [John T. Lister, United States patent No. 1,147,254.]

A NEW ABRADING MACHINE.

In Blaisdell's machine rubber strips or sheets are roughened on both sides by being drawn between abrading wheels.

The same letters refer to the same parts in both the plan and side elevation views of the machine. The side frames *A* support two pairs of oppositely placed abrading wheels *B* and *C* driven by belt *D* and spur gearing *E* from the main shaft *F*. The strips are drawn through the machine by pairs of rollers *G*, *H* and *I* driven by chain belt *J*. Tension is maintained on the strip by driving the front rollers *G* at a lower speed than the rollers *H* and *I*.

Referring to the side elevation, the strips are fed from the stock spools *K* and after passing between the abrading wheels *B* and *C* are wound up on the spools *L*. The strips are kept up to the wheels by idler rollers *M* and *N* shown in the plan view. The four rollers *M* in front of the abrading wheels are crowned



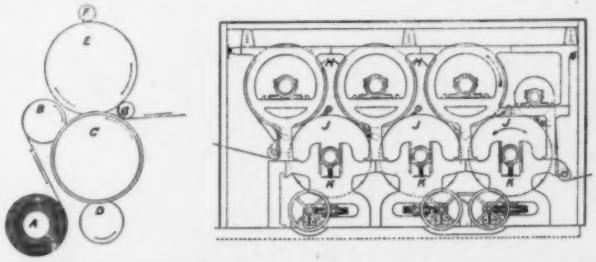
Plan

Side Elevation

or elliptical in shape to equalize the abrading action over the surfaces of the strips. The particles of material removed are carried away through pipes by an exhaust fan. As the strips leave the last pair of rollers they are passed over smoothing bars which remove the creases and wrinkles. [F. E. Blaisdell, British patent No. 8,121, 1914.]

BELTING AND PACKING MACHINE.

In Matthew's machine, belting is calendered, embossed with patterns and vulcanized by being led in a sinuous path around and between the surfaces of heated rotary cylinders. Referring to the drawing on the left, the belting is led from a reel *A* over the warming-up cylinder *B* to the flanged main cylinder *C*, and is calendered by a heated cylinder *D*, which may travel at a higher speed than the cylinder *C*. The belting is then passed over the

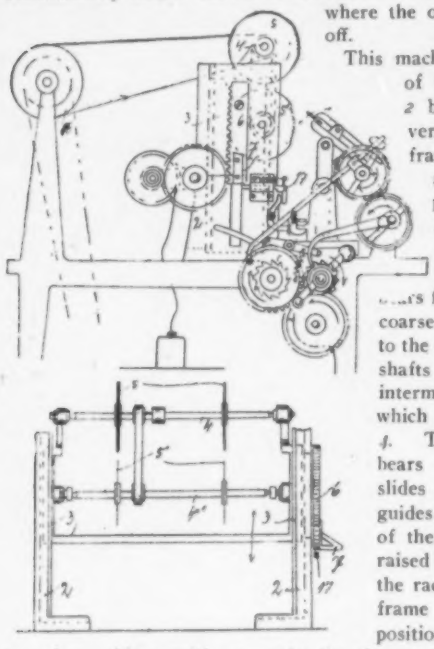


vulcanizing cylinder *E* and is pressed by one or more pressure rolls *F* and led off by a leading-off roll *G*.

In the form shown in the illustration on the right a series of upper and lower cylinders, *H* and *J*, are employed, the latter being adjustable by screws *K*. This form is used for waterproof fabrics and sheet and insertion rubber. The whole apparatus may be enclosed in a casing. [P. M. Matthew, British patent No. 5,464, 1914.]

NEW COMB CUTTING MACHINE.

This is a new German comb cutting machine that operates at the same time a set of fine and a set of coarse cutting saws and automatically causes one set of saws to take up the cutting work where the other set has left off.

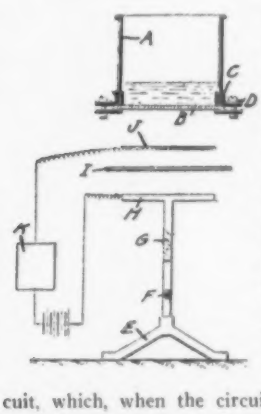


This machine is composed of two side frames *2* between which a vertically movable frame *3* is mounted and bears two superimposed shafts *4*, *4'* on which saws are keyed. The lower shaft bears fine saws *5'*, while coarse saws *5* are keyed to the upper shaft. Both shafts are driven from intermediate shaft *6*, which is belted to shaft *4*. The frame that bears the saw shafts slides vertically in the guides of the frames *2* of the machine and is raised and lowered by the rack *6*. When this frame is in its highest position the coarse saws *5* are in working position opposite the piece to be cut. [German patent No. 626,519.]

APPARATUS FOR TESTING IMPERMEABILITY OF FABRICS.

The device illustrated herewith is for testing the non-permeability to water of textile fabrics, especially of cloth intended for military uniforms.

It consists of a glass cylinder *A*, open at both ends, graduated in depth in centimeters, with a flanged brass collar, to which the sample of cloth *B* to be tested is secured by a brass ring *C*, and bolts *D*. A tripod *E* with a stem pivoted at *F*, and an insulating portion *G*, carries a brass disc *H* upon which is laid a circular piece of thin paper *I*, which has been soaked in a solution of potassium sulphate, dried and waxed for a width of 1 centimeter (.3937 inch) round the perimeter. Upon the paper a disc of very thin wire gauze *J*, of platinum or gilt copper, is placed, and *H* and *J* are connected to the poles of a battery with a relay *K* in circuit, which, when the circuit is closed, actuates the style of a recording chronograph, immediately afterwards breaking the circuit and ringing a bell.



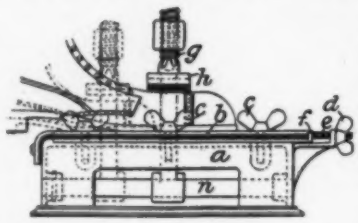
In testing a fabric proofed with rubber, the disc *B* is placed directly on *J*; if rubber is not used, a space of 5 millimeters (.19685 inch) is left between *B* and *J*. Distilled water is poured into the vessel *A* up to a known depth, the electric circuit is closed and the chronograph is started. When—if at all—the water penetrates the fabric, it moistens the paper and completes the circuit, actuating the relay. If artificial rain is to be used for the test, *A* is turned upside down on the table, the top of which is set on a slope by means of the joint *F*, and a jet of water from a capillary orifice is allowed to fall from a known height upon the cloth. Penetration is announced automatically, as above described. Thus, it is claimed, the water-proof qualities of cloth can be measured under standardized conditions.

Another instrument for measuring impermeability of cloth was described in THE INDIA RUBBER WORLD of June 1, 1915. Briefly, this consists of a copper cylindrical box to which a measuring glass tube and a rubber bulb are attached. The box and bulb are filled with water and the cloth to be tested is fastened to the top of the box. By pressing the bulb the height of water in the glass tube is increased and the water forced through the cloth. The height of the water column measures the impermeability of the fabric.

RUBBER SOLE PRESS.

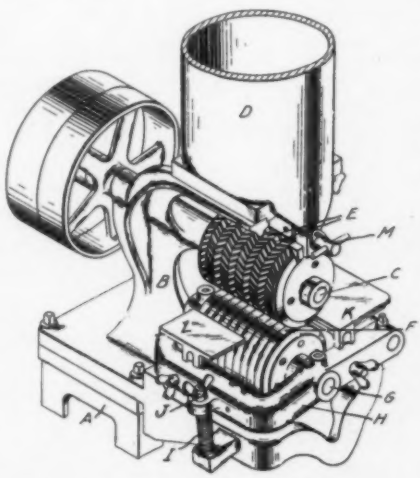
This German device holds the sole firmly in contact with the boot, while the cement dries.

The frame of the press *a* supports the elastic bed *b* on which the soles of the boot rests. One end of the bed is attached to the frame and the other to a sliding frame *f* which is adjusted by a screw *e* and wing nut *d*. Clamping screws *c* hold the sides of the bed in position. The clamping pad *h*, operated by a screw *g*, and adjustable along the guide bar *n*, holds the boot and sole firmly in place. [Continental Caoutchouc & Gutta Percha Co., Hanover. British patent No. 6216-1914.]



RUBBER CEMENT APPLYING MACHINE.

In the manufacture of leather boots and shoes the edges of the soles, particularly at the shank portion, are skived. This results in a sole that is not uniform in thickness and therefore is improperly coated when run through a cementing machine of the ordinary type. Julian's machine overcomes this difficulty, however, by employing a lower roller of novel form. This is made up of circular sections, movable vertically by springs of sufficient strength to force the thinner portions of the sole against the upper cement roller so that all portions of the sole approximately lie in the same plane, insuring an even coating of cement irrespective of variations in thickness.



Referring to the drawing, *A* is the base of the machine and *B* the standard that supports the belt-driven shaft *C* upon which is fastened the cement-applying roller. Above this roller is the cement tank *D* provided with a nozzle and spreader that deliver the cement evenly to the roller *E*. Surplus cement is controlled by a flexible scraper located opposite the spreader and in contact with the cement roller.

The roller *F* is made up of separate rings held in position on the shaft *G* by vertically yielding springs. It is mounted in the swinging bracket *H* which is held in a raised position by the spring rod *I* and regulated by the wing nut *J*. The bracket *H* yields to accommodate soles of different thickness and the spring controlled rings of the roller *F* force the thinner portions of the sole into contact with the cement roller *E*. [Gideon J. Julian, assignor to United Shoe Machinery Co., United States patent No. 1,145,996.]

OTHER DEVICES.

A NEW TIRE.—McNaull's latest patent covers a novel method of attaching the beads to the fabric that forms the casing. Each bead is made up of three groups of wires. The margins of the six strips of fabric which extend across the tire, forming the casing, are folded around each opposite group of wires. An additional strip of fabric extends across the inner side of the casing covering the three opposite groups of wires, its margins overlapping the outside groups of wires and their coverings. [William D. McNaull, United States patent No. 1,147,032.]

AUTOMATIC MACHINE FOR MAKING TUBULAR FABRIC.—Subers has patented a machine for making unwoven laminated tubular fabric in continuous lengths on horizontal, moving mandrels from bands of cords previously impregnated with rubber. [Lawrence A. Subers. United States patent No. 1,145,446.]

A PORTABLE ELECTRIC VULCANIZER.—It is a small and compact car vulcanizer, operated by electric current of low voltage that is available from the storage battery usually carried in automobiles for lighting and ignition. [Oliver C. Dennis. United States patent No. 1,147,847.]

IMPROVED SLITTING AND REWINDING MACHINE.—Cameron has invented a new slitting method by which the spreading of the cut material is avoided. The circular cutter has two cutting edges which sever the web, producing a thin narrow strip which is either rewound with the cut sections or removed from the machine. [James A. Cameron and Gustaf Birger Birch, assignors to Cameron Machine Co. United States patent No. 1,148,146.]

METHOD OF MAKING WATER BOTTLES.—The body and neck portions are molded in a single piece over a core. The neck is formed with an opening so that the core can be withdrawn. [George E. Hall. United States patent No. 1,148,226.]

INNER TUBE TESTING AND TIRE CARRYING DEVICE.—This is an annular trough-shaped receptacle made of any material that will hold water. It serves the two-fold purpose of a device for testing inner tubes for leaks and a tire-case adapted to be carried on the tire-holder of an automobile. [Jacob Closz. United States patent No. 1,148,287.]

AIR BAG FOR REPAIRING TIRES.—The bag consists of an inner tube and valve with outer covering of frictioned duck. It is used in the ordinary mold for repairing tire casings and when inflated holds the patch under compression and the outer surfaces firmly in contact with the walls of the mold. [Alvin L. Johnson and Alfred O. Alsten. United States patent No. 1,148,171.]

MACHINE FOR ARMORING AIR BRAKE HOSE.—In the manufacture of rubber hose for railway service and particularly the hose sections coupling the locomotive and tender, it is desirable to reinforce the hose by winding with wire. Sill has invented a simple and effective machine for doing this work. [Samuel J. Sill, assignor of one-half to Herbert H. Hewitt. United States patent No. 1,149,224.]

METHOD OF MAKING CORD TIRES.—The cords are made by twisting rubber-impregnated strands around a core of soft rubber. These are cut into equal lengths and laid parallel to one another on the annular core at an angle of 60 degrees. The bead cores are then applied and a second ply of cords is laid over the first at a reverse angle. [Richard Griffith, assignor to Miller Rubber Co. United States patent No. 1,149,364.]

PRESSURE CURE VULCANIZER.—Boots and shoes are vulcanized by being placed on lasts and enclosed in an envelope and then subjected to the action of heat and pressure in a vulcanizer. The envelope prevents contact with the air or live steam, thus eliminating oxidation. [Apsley Rubber Co., British patent No. 6,763, 1914.]

The United States patent No. 1,090,535, granted to William G. Hill, assignor to Apsley Rubber Co., Hudson, Massachusetts, apparently identical with the above, was illustrated and described in THE INDIA RUBBER WORLD, May 1, 1914.

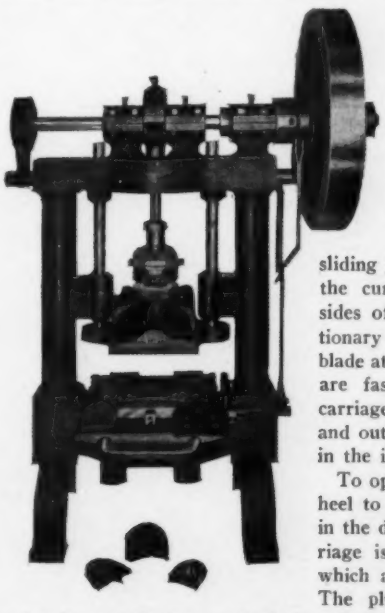
MANUFACTURING CONTINUOUS LENGTHS OF SOFT RUBBER COMBINED WITH HARD RUBBER.—Solid tires with hard rubber foundation or solid tires with a metal rim, covered on both sides with hard rubber, are made by Gare's process. The soft and hard rubber compounds are separately fed into the mold, where they are formed and compressed by a plunger. The two bodies are brought in contact before passing through the heated part of the mold, where they are vulcanized together and extruded from the machine, a molded tire on a hard rubber foundation. [Thomas Gare, United States patent No. 1,146,699.]

A BELTING AND SHEET CALENDER VULCANIZER.—Belting, waterproof fabrics and sheet are calendered and vulcanized by passing them around a series of heated pressure rolls. [P. M. Matthew. British patent No. 5,464.]

A NEW BRAIDING MACHINE.—Pneumatic tires are made on a vertical braiding machine adapted to support and slowly rotate a core upon which the casing is braided. When the braiding is finished the core is removed from the machine, the casing slitted around the inner circumference of this core and the braided fabric removed for subsequent treatment. [W. H. Dunkerley and T. J. Arnold, British patent No. 7,226, 1914.]

A NEW OVERFLOW TRIMMING PRESS.

The automatic machine shown in the accompanying illustration has been recently designed for trimming the rind or overflow from rubber heels, soles, horseshoe pads, valves and other mechanical goods made in molds.



It is constructed on the principle of an ordinary belt-driven punch press with a reciprocating plunger and operated by the usual trip rod. The heel die consists of two sliding jaws corresponding to the curve of the back and sides of the heel, and a stationary breast with a cutting blade attached. The die parts are fastened to the sliding carriage, which is moved in and out by the handle shown in the illustration.

To operate the machine, the heel to be trimmed is placed in the die cavity and the carriage is pushed forward, which action trips the press. The plunger head descends and strikes on the two vertical pins which force the sliding jaws together. These close tightly around the heel and against the breast, cutting through the overflow. The press then comes to a full stop. When the carriage and die are drawn out, the ejector throws out the trimmed heel, and another heel is placed in the die cavity and the operation repeated. [Rumrill & Co., Boston; Arthur J. Wills, North Brookfield, Massachusetts, sales agent.]

SHIPPING CARS EQUIPPED WITH TIRES DIRECT TO NEUTRAL COUNTRIES.

IT will be recalled that the August number of this publication contained an editorial calling attention to the fact that while American rubber manufacturers had very carefully lived up to their agreement not to ship rubber goods to neutral countries in Europe except via London, some of their customers, notably manufacturers of motor cars, had not been so careful, as there had been repeated shipments of cars fully equipped with tires direct to neutral countries.

The Rubber Control Committee of the Rubber Club has sent out a letter, under date of August 4, covering this very matter. The letter states:

"The British government has officially called the attention of the Rubber Control Committee to the frequent violation of the provision of the bonds and guarantees respecting the shipment of manufactured rubber goods to neutral European countries. Since the American manufacturers gave their bonds and guarantees to the British government last winter in consideration of which they have since been securing their supplies of crude rubber, a number of consignments of rubber goods have been shipped direct to neutral European countries without evident regard to the clause in the bonds and guarantees providing that they 'will not sell any manufactured or partly manufactured rubber goods to any person in the United States without satisfying themselves that there is no intention on his part to export or re-sell the same for exportation to any countries in Europe other than Great Britain, France, Russia or Italy, otherwise than by shipping to the United Kingdom and re-shipping from there under license to be obtained for export therefrom.'"

The committee then goes on to say:

"The experience of six months has shown that while rubber manufacturers themselves have zealously adhered to the terms of their bonds and guarantees, some automobile and motorcycle manufacturers either do not sufficiently understand the importance of the situation or have not given the information thoroughly to all members of their organizations. As a consequence nearly every vessel clearing for Scandinavian, Dutch and Mediterranean ports has carried automobiles and motorcycles equipped with tires."

The British Foreign Office is considerably concerned over these violations of the guarantees and the committee is anxious that every rubber manufacturer should make every effort to see that none of his product when sold to an American customer shall find its way to a purchaser in a neutral country except by way of London, and it makes the following request:

"It seems desirable at the present time to assure the British Consul General at New York that American rubber manufacturers have taken adequate means to see that the provisions of the guarantees and bonds in respect to shipments to neutral European countries are being carried out. We, therefore, invite every rubber manufacturer signatory to a bond or guarantee to file with The Rubber Club of America, Inc., a statement of what they are doing to satisfy themselves that there is no intention on the part of their customers to violate the provision above quoted. The Rubber Control Committee, which has been in general charge of the relations of the American rubber trade with the British government since February 1, 1915, regards this as a matter of the utmost importance, and would ask for an early reply."

TO FACILITATE RE-SHIPMENTS FROM LONDON.

The Rubber Club of America, Inc., has sent a circular letter to all rubber manufacturers in this country stating that it has received a number of reports of delays in the export of rubber goods to neutral countries when shipped by way of the United Kingdom, in accordance with the provisions of the guarantee given the British government by American manufacturers. The Club desires to correct this condition and asks every manufacturer to send full details of any such experiences in delayed re-shipments at London since the first of last February. It is the Club's intention to get all this evidence together and then make a collective protest to the British War Trade Department, with the hope that such delays may be avoided in the future or at least reduced to a minimum.

THE RUBBER CLUB YEARBOOK.

The Rubber Club Yearbook, covering its sixteenth year, has just been sent out by the secretary. It is not quite as large a book as the one issued a year ago, as it does not include proceedings of the annual meeting and the reports of the various officers, as was the case in the 1914 book. The present volume is 4 x 9 inches, a convenient size for the desk pigeonhole, and consists of 44 pages with cover. It contains the new charter taken out in the state of Connecticut last March and the revised constitution and by-laws adopted last April. In addition it gives not only a list of the Club's present membership and all its present officers, but lists of all those who have held any office in the past. One noticeable change in the constitution is the elimination of the active member—all members now are either Firm, Associate or Honorary. Another feature which is new to this book is the listing of the officers and members of the Mechanical Rubber Goods Manufacturers' Division and of the Rubber Sundries Manufacturers' Division.

The membership of the Club at the time of issuing this latest report was as follows: Honorary 1 (Sir Henry A. Blake, of England), Firm members 177, Associate members 228, making a total membership of 406, as against 338 a year ago. The firm membership had had an increase of 109 names during the year.

AMERICAN EXPRESS CO. HELPS THE RUBBER CLUB.

Attention was called in the August number of this publication to the fact that, while American rubber manufacturers had lived up very scrupulously to the guarantee they gave the British government not to ship rubber manufactured goods to neutral European countries except by way of English ports, some of their American customers who used rubber manufactured goods in an accessory way had not been so careful. The Control Committee of the Rubber Club had received several complaints from the British consular office in New York that automobiles fully equipped with rubber tires were being shipped to Mediterranean and Scandinavian ports.

These complaints were ascertained to be well founded; and many of these direct shipments had been made through the American Express Co. It was perfectly natural that the express company should forward these goods, as it was in no way a party to the agreements made between the rubber manufacturers and the British government, and it was therefore quite in the ordinary course of business that it should forward automobiles, whether equipped with tires or not, to their destination, provided the steamship companies would accept the shipment.

But when the officers of the Rubber Club brought the matter to the attention of the officers of the express company, explaining the guarantees made by the rubber manufacturers and showing how embarrassing, not to say disastrous, it would be to the rubber trade of the United States if the British government were to re-establish its embargo on crude rubber, the officers of the company, after due consideration, conceded that this was a matter of vital importance to the American rubber trade and voluntarily agreed, by refusing any further shipments of this nature, to assist the Rubber Club in preventing any future violations of the agreement made with Great Britain.

This co-operation of the American Express Co. in this matter will be of very material assistance, for if manufacturers of automobiles, or other articles in which rubber plays an essential part, have a temporary lapse of memory in regard to the guarantees, the refusal of the express company to forward their shipments will act as a very effective reminder.

The Obituary Record.

PROFESSOR THOMAS B. STILLMAN.

THOMAS BLISS STILLMAN, for thirty-five years Professor of Analytical Chemistry at the Stevens Institute of Technology, Hoboken, New Jersey, and an authoritative writer on the chemistry of rubber, died at his home in Jersey City August 10, in his 64th year, after an illness of several weeks.

Professor Stillman retired from his position in Stevens Institute in 1909 and since that time had been city chemist for Jersey City and Bayonne and had also been connected professionally with the city department of Newark. He was very much interested in synthetic chemistry, not only as referring to rubber but to other commodities, and he received a great deal of newspaper attention in 1906, when he gave a "synthetic dinner" at the Hotel Astor—which was described in the press at that time as follows: "He created from various chemicals and under the very eyes of his guests, wines, sauces, salads and other foods in every respect as tempting to the palate as if they had been the products of the vineyard and garden. His guests ate them with wonderment and relish, and none suffered evil effect."

Another episode in his life was equally interesting but rather less fortunate in its dénouement. In 1911 a certain inventor announced that he had discovered the secret of making synthetic rubber. He sought to interest capitalists in the enterprise. In order to be on safe ground the capitalists secured the services of Professor Stillman, who was to make a thorough investigation of the matter. He was at first quite skeptical, but as he watched the inventor at his work and finally in the last stage saw particles of a putty-like substance floating on the top of the mixture, which substance when dried had every appearance and characteristic of rubber, he became greatly interested. Following the instructions of the inventor he tried the experiment himself, with equal success, and on the strength of his report a company was formed for the manufacture of this synthetic rubber. But the synthetic rubber was never forthcoming, the result of the enterprise simply being that some of the capitalists' money was transferred to the pockets of the inventor. The whole explanation undoubtedly was that by some process of legerdemain the inventor had introduced into his mixture a certain amount of genuine rubber and thus had deceived the distinguished chemist.

Professor Stillman was a member of many chemical and scientific societies on both sides of the water. He was the author of "Engineering Chemistry," which was first published in 1897 and re-published in various subsequent editions. He contributed extensively to scientific journals.

THREE CHILDREN OF PRES. BRYANT PERISH BY FIRE.

Mary, Lucy and Helen Bryant, nine, seven and six years old, respectively, the three small daughters of George G. Bryant, president of the Racine Rubber Co., of Racine, Wisconsin, lost their lives in the fire which on August 5 destroyed ten summer cottages at Lake Delevan, Wisconsin.

WILLIAM LORD.

William Lord, at one time connected with the Hartford Tire Co., died at the Flower Hospital, New York, August 5, from pneumonia following an operation.

He was born in England 74 years ago and came to this country while still a young boy, settling in Lawrence, Massachusetts. He went to the Civil War as a drummer boy of the Fortieth Massachusetts Volunteers. After the war he associated himself with the Lyall Cotton Mills and occupied the position of general manager for 32 years. He then became chief inspector for the Hartford Tire Co. He invented a number of improvements in the process of rubberizing cloth. He made his home during the last years of his life in New York City.

D. AUSTIN BROWN.

D. Austin Brown, of Boston, for many years New England manager of the Asbestos Packing Co., after the amalgamation of that company with the H. W. Johns-Manville Co., of New York, died August 11 in New Haven, Connecticut, at the home of his daughter. He was also at one time manager of the Bells Asbestos Co., Limited, of London, which operated the mines at Thetford, Canada, later sold to a Philadelphia company. He was born in Boston, of Puritan ancestry, being a direct descendant of Alexander Higginson, the first minister of Salem, Massachusetts, and a member of the Eppes, Hoar, Prescott, Fellows and Trowbridge families of New England. He is survived by three daughters.

JAMES F. MC KEON.

James Francis McKeon, founder of the firm of James F. McKeon & Son, dealers in waste rubber, etc., of 12 Front street, New York, died at his home in Brooklyn on July 17, of Bright's disease. He was born in New York, March 11, 1856, and had been in the waste material business since 1880, first becoming interested in waste rubber in 1902. The present firm was founded in 1910. He was a member of the National Association of Waste Material Dealers. He is survived by his wife, three daughters and two sons, James F., Jr., and Walter E., under whose management the business will be continued.

JOSEPH MOIR.

Joseph Moir, a well-known rubber planter of Johore, died May 27, at Singapore, of malarial fever, at the age of 52 years. He was born in Keith, Scotland, and while still quite young went to Demerara, where he became manager of a large plantation near Georgetown. He had made a thorough study of tropical problems and had held various important commissions, in the execution of which he visited Central and South American countries and Portuguese West Africa. About five years ago he left Georgetown and had since been associated with rubber growing companies in the Straits Settlements. At the time of his death he was on his way home, with his wife, to Aberdeen, Scotland, where he was Commandant of the Aberdeen contingent of the Legion of Frontiersmen.

EMIL RATHENAU.

Emil Rathenau, general manager of the General Electric Co. of Germany, and one of the great industrial leaders of that country, died in Berlin on June 20 at the age of 76 years. Mr. Rathenau was the founder and controlling figure of the largest electrical company of Germany. Thirty years ago he founded The Edison Incandescent Electric Light Co. of Germany, with a capital of 500,000 marks ($119,000). This company later became the General Electric Co. of Germany.

FILING OF THE WILL OF THE LATE W. M. IVINS.

The will of the late William M. Ivins, former president of the General Rubber Co., and a noted lawyer of New York (notice of whose death appeared on page 609 of our August issue) has been filed. By its terms the entire estate is left to his wife, Mrs. Emma Yard Ivins, and in it attention is called to the fact that provision had been made for his children in the form of insurance on his life.

Official India Rubber Statistics for the United States.

IMPORTS OF RUBBER AND MANUFACTURES OF.

	June 1914. Quantity.	June 1914. Value.	June 1915. Quantity.	June 1915. Value.	Twelve Months Ending June 1913. Quantity.	1913. Value.	1914. Quantity.	1914. Value.	1915. Quantity.	1915. Value.
India rubber, etc., and substitutes for, and manufactures of:										
Unmanufactured—										
Balata .....*pounds*..free	106,295	$61,432	148,581	$55,842	1,318,598	$766,772	1,533,024	$793,126	2,472,224	$963,384
Guayule gum	59,910	12,457	299,381	79,005	10,218,191	4,345,088	1,475,804	607,076	5,111,849	1,441,367
Gutta-jelutong	1,477,881	63,549	1,607,234	77,232	45,345,338	2,174,441	24,926,571	1,155,402	14,851,264	731,995
Gutta-percha	176,052	34,758	4,543	1,013	480,853	167,313	1,846,109	323,567	1,618,214	230,750
India rubber	9,428,700	4,898,062	18,785,812	9,705,718	113,384,359	90,170,316	131,995,742	71,219,851	172,068,428	83,030,269
India-rubber scrap or refuse, fit only for re-manufacture	2,596,809	174,073	1,173,808	74,895	43,385,456	3,709,238	25,958,261	2,063,198	11,006,928	726,914
Total unmanufactured.	.....	$5,244,331	.....	$9,993,705	.....	$101,333,168	.....	$76,162,220	.....	$87,124,679
Manufactures of—										
Gutta-percha .....dutiable	.....	$4,174	.....	$137	.....	$77,300	.....	$42,023	.....	$10,841
India rubber ..... "	.....	153,601	.....	52,025	.....	1,217,236	.....	1,517,789	.....	791,281
Total manufactures of.	.....	$157,775	.....	$52,162	.....	$1,294,536	.....	$1,559,812	.....	$802,122
Substitutes, elasticon, and similar .....dutiable	.....	$7,424	.....	$2,517	.....	$97,452	.....	$87,642	.....	$30,349

IMPORTS OF CRUDE RUBBER BY COUNTRIES.

From:										
Belgium .....*pounds*	565,075	$332,468	.....	.....	5,917,440	$5,412,395	10,978,753	$6,462,760	1,902,370	$950,872
France	49,476	20,880	10,531	$5,082	2,968,232	2,584,677	2,629,287	1,124,629	685,699	284,862
Germany	477,789	253,054	.....	.....	7,790,742	5,942,371	7,079,260	3,614,510	739,105	358,931
Portugal	22,118	8,161	554,408	211,052	873,249	642,304	556,560	177,687	4,130,624	1,374,526
United Kingdom	3,860,538	2,249,110	8,893,562	4,707,279	34,164,908	33,586,808	48,279,674	31,152,336	75,168,236	39,188,519
Central American States and British Honduras	49,219	27,385	97,940	49,698	989,772	661,001	565,487	297,849	949,865	414,441
Mexico	46,659	26,442	103,060	37,522	2,033,791	1,335,927	640,448	333,327	1,668,415	650,975
Brazil	2,368,526	880,534	3,770,543	1,895,683	43,518,861	25,905,641	40,641,305	16,319,048	48,753,670	20,738,776
Other South America.....	85,991	33,945	232,308	108,372	2,267,050	1,630,608	1,845,422	806,888	4,708,390	2,008,790
East Indies	1,742,477	975,301	5,109,924	2,684,580	12,255,500	11,888,553	16,597,105	9,675,709	27,898,683	14,051,598
Other countries	160,832	90,782	13,536	6,450	604,814	580,031	2,182,441	1,255,108	5,463,371	3,007,979
Total	9,428,700	$4,898,062	18,785,812	$9,705,718	113,384,359	$90,170,316	131,995,742	$71,219,851	172,068,428	$83,030,269

EXPORTS OF AMERICAN RUBBER GOODS.

India rubber, manufactures of:										
Scrap and old .....*pounds*	597,459	$65,342	365,527	$49,640	7,269,465	$880,442	6,207,678	$598,287	2,422,091	$291,421
Reclaimed	681,204	94,599	613,433	77,291	5,413,247	932,904	5,583,860	834,440	5,970,380	822,561
Belting, hose and packing....	.....	214,155	.....	178,517	.....	2,605,551	.....	2,372,887	.....	1,807,848
Boots and shoes—										
Boots .....*pairs*	14,904	33,709	3,313	9,092	109,528	274,330	101,361	279,206	318,727	726,765
Shoes	82,266	45,583	99,269	48,071	2,231,467	1,163,953	1,634,258	834,289	2,219,900	2,053,560
Tires—										
For automobiles	.....	453,178	.....	738,862	.....	3,943,220	.....	3,505,267	.....	4,963,270
All other	.....	34,787	.....	119,050	.....	611,458	.....	563,372	.....	576,602
All other manufactures of.	.....	280,752	.....	480,582	.....	3,913,036	.....	3,453,472	.....	3,525,486
Total	.....	$1,222,105	.....	$1,701,105	.....	$14,324,894	.....	$12,441,220	.....	$14,767,513

EXPORTS OF AUTOMOBILE TIRES BY COUNTRIES.

To—										
Belgium	.....	.....	.....	.....	.....	$401,900	.....	$15,730	.....	.....
Germany	.....	$6,586	.....	.....	.....	401,196	.....	132,181	.....	$6,090
England	.....	192,510	.....	$365,606	.....	1,125,718	.....	1,503,440	.....	2,655,099
Canada	.....	168,976	.....	110,852	.....	1,324,459	.....	961,937	.....	772,574
Cuba	.....	.....	.....	29,790	.....	.....	.....	.....	.....	106,083
Mexico	.....	2,577	.....	7,117	.....	203,883	.....	111,948	.....	190,813
Australia	.....	.....	.....	64,519	.....	.....	.....	.....	.....	245,240
Philippine Islands	.....	14,040	.....	25,025	.....	100,476	.....	141,205	.....	250,832
Other countries	.....	68,489	.....	135,953	.....	385,588	.....	638,826	.....	736,539
Total	.....	$453,178	.....	$738,862	.....	$3,943,220	.....	$3,505,267	.....	$4,963,270

EXPORTS OF FOREIGN MERCHANDISE.

India rubber, etc., and substitutes for, and manufactures of:										
Unmanufactured—										
Balata .....free	12,297	$6,630	52,624	23,017	118,334	$77,963	223,983	$127,139	1,076,619	$426,735
Guayule gum	2,250	1,058	5,000	1,940	83,769	54,669	56,399	22,378	29,891	8,931
Gutta-jelutong	.....	.....	.....	.....	3,000	163	32,330	2,195	.....	.....
Gutta-percha	2,240	1,700	.....	.....	22,352	2,665	14,319	5,060	9,457	4,603
India rubber	310,686	176,522	399,302	194,457	5,272,387	4,476,379	3,747,749	2,398,150	6,393,145	3,361,107
India rubber scrap or refuse, fit only for re-manufacture	324	8	3,483	373	87,930	10,723	24,316	2,450	3,483	373
Total unmanufactured.	.....	$185,918	.....	$219,787	.....	$4,622,562	.....	$2,557,372	.....	$3,801,749
Manufactures of—										
Gutta-percha .....dutiable	.....	.....	.....	.....	.....	$27,906	.....	.....	.....	$7,489
India rubber	.....	$404	.....	$1,983	.....	7,973	.....	$7,638	.....	364
Substitutes, elasticon and similar	.....	.....	.....	.....	.....	559	.....	.....	.....	.....

News of the American Rubber Trade.

CANADIAN CONSOLIDATED COMPANY WINS SUIT AGAINST RAILROAD.

A SUIT in a New York court brought by the Canadian Consolidated Rubber Co., Limited, of Montreal, Quebec, against the New York Central railroad, to recover $699.70 for loss of raw rubber in transit, has been decided in favor of the plaintiff, the court holding that the defendant as a common carrier was liable for the loss unless it could prove that this was the result of fortuitous event or irresistible force, or a defect in the rubber itself, and that the defendant had failed to make such proof. The railroad company had denied both the shortage and the liability.

THE MARKS RECLAIMING PATENT UPHELD IN NEW YORK.

In the suit brought by the Philadelphia Rubber Works Co., of Philadelphia, against the U. S. Rubber Reclaiming Co., Inc., of Buffalo, Judge Hazel, sitting in the United States District Court for the Western District of New York, has decided in favor of the complainant, with costs. The suit was for an injunction and accounting, and alleged infringement of patent No. 635,141, October 17, 1899, to Arthur H. Marks and assigned to the complainant, for a process of reclaiming rubber from vulcanized rubber waste.

Judge Hazel from the evidence presented holds that the patent in suit has the merit of accomplishing a new result by the application of a new process to the reclamation of rubber waste and that as the defendant appropriated the essential features of the process, thereby achieving the same results, he must be held to have unlawfully appropriated the process.

It will be recalled that the opposite view was held by Judge Clarke in the Northern District of Ohio, Eastern Division, wherein he held invalid the same patent in suit, for want of novelty and invention.

RUBBER COMPANY SHARE QUOTATIONS.

The following market quotations of the shares of rubber manufacturing companies on August 25 last are furnished by John Burnham & Co., 31 Nassau street, New York, and 41 South La Salle street, Chicago:

	Bid.	Asked.
Ajax-Grieb Rubber Co., common	300	..
Ajax-Grieb Rubber Co., preferred	101	..
Firestone Tire & Rubber Co., common	525	530
Firestone Tire & Rubber Co., preferred	111	..
The B. F. Goodrich Co., common	61¼	62¾
The B. F. Goodrich Co., preferred	107	109
The Goodyear Tire & Rubber Co., common	270	274
The Goodyear Tire & Rubber Co., preferred	108½	110
Kelly-Springfield Tire Co., common	175	182
Kelly-Springfield Tire Co., 1st preferred	85	86
Kelly-Springfield Tire Co., 2d preferred	175	185
Miller Rubber Co., common	190	194
Miller Rubber Co., preferred	107½	..
Portage Rubber Co., common	46	48
Portage Rubber Co., preferred	93	94
Rubber Goods Manufacturing Co., preferred	..	..
Swinehart Tire & Rubber Co.	88	90
United States Rubber Co., common	51	53
United States Rubber Co., first preferred	104	106

RUBBER COMPANY DIVIDEND.

The B. F. Goodrich Co., of Akron, Ohio, has declared a dividend of 1¼ per cent. on the preferred capital stock of the company, payable October 1 to stockholders of record on September 20.

VULCANIZED PRODUCTS CO. TO MAKE TIRES.

The Vulcanized Products Co., of Muskegon, Michigan, which in the past has confined its activities to the production of electrical and mechanical goods and tire accessories, is adding a new factory building for the manufacture of automobile tires and tubes. This will probably be ready for operation early in October, will have a capacity of about 200 tires and tubes daily and will provide employment for about 50 operatives.

INTERNATIONAL STAMP MAKERS' CONVENTION.

The International Stamp Manufacturers' Association held its fourth annual meeting July 14-16 at Portland, Oregon, with headquarters at the Multnomah hotel. Owing to illness, the president, Charles Everson, of New York, was unable to be present, and M. L. Willard, of the Superior Rubber Type Co., Chicago, presided in his stead. The meeting was a successful one, both from point of attendance and general interest. Resolutions of regret at the absence of the Association president were adopted and a copy sent to Mr. Everson. New officers were elected for the coming year, the president being E. J. McArdle, of Omaha, Nebraska; treasurer, A. Woodruff, Auburn, New York; vice-presidents, E. M. Tilden, Washington, D. C.; E. T. Rinehart, Los Angeles, California; F. H. Bronner, Portland, Oregon, and B. B. Cairnes, Toronto, Ontario. A proposal that the next convention be held at Chicago met with approval, and a motion to that effect was carried.

RUBBER COMPANIES AFFECTED BY STRIKES.

Among the rbbber companies affected by recent strikes among the workers are two in Bridgeport, Connecticut—the Canfield Rubber Co. and the Siemon Hard Rubber Corporation. At the former plant refusal of the workers' demands for shorter hours and increased pay resulted in a strike of about 260 operatives on August 23 and 24. The president of the Siemon Hard Rubber Corporation, Carl F. Siemon, is quoted as stating that the demands of 200 employees on strike for abolition of piece work and substitution of a flat wage scale at the plant of that company will not be granted.

FIRES AND EXPLOSIONS.

A fire of mysterious origin occured at the plant of the National Conduit & Cable Co., at Hastings, New York, August 17, but was extinguished with damage amounting to only a few hundred dollars. This company employs about 3,000 men and has been of late turning out large orders for shipment to the allied and neutral European countries.

At the Turtle Creek plant of the Westinghouse Electric Co., which has been running to capacity on army orders, an explosion on August 13—following the receipt by a Pittsburgh paper of a letter stating that the plant was to be blown up—killed two men and injured 6 others, in addition to the damage done to the plant.

ASBESTOS PRODUCTION.

The asbestos production of the United States in 1914 showed an increase of 13 per cent. over that of the previous year, reaching 1,247 short tons, valued at $18,965. This is a 72 per cent. increase in value as compared with the 1913 production, one of the most notable features of the industry being the development of a new field in Arizona which produces a higher grade of asbestos than any hitherto found in this country.

A company is being organized in Oakland, California, with L. V. Stevens, a mining engineer, at its head, to operate an asbestos plant in that city. This organization is said to be the result of a discovery of asbestos in Trinity county, in the northern part of the state.

Valuable deposits of asbestos of good quality have recently been found in western China, near the city of Pachow.

MECHANICAL RUBBER CO. OF CLEVELAND.

During the past three years the extensive plant of the Mechanical Rubber Co., of Cleveland, has been effectually modernized under the factory management of A. T. Hopkins. Rearrangement of the power plant and new installations have resulted in a notable saving. The druggists' sundry and specialty lines of the United States Rubber Co. are concentrated at this factory, where there exists specifications for a practically unlimited list of specialties, in addition to the usual standard variety of mechanicals. The factory management wisely fosters consideration of the human element and finds great satisfaction in the generous response made to every effort in that direction. They have an emergency room, in charge of a trained nurse; a branch of the Cleveland Public Library and several tennis courts for the use of the employees; while here and there window boxes of bright flowers add a pleasant touch of color to a remarkably orderly and attractive factory arrangement.

THE HEWETT PLANT AT BUFFALO.

The Hewett Rubber Co., of Buffalo, New York, is rapidly installing additional mills and calenders in its elaborate new factory extension. The entire plant is a model in fireproof construction and arrangement.

The plan and equipment of the plant mark a radical departure in rubber mill construction. Spaciousness and ample daylight illumination are a special feature of the Hewett factory. Each mill and calender is operated, by its independent motor, by Niagara electric power.

A 1,000 horse-power steam plant for heating and vulcanizing occupies an elevated position, and above it are suspended steel coal pockets holding 500 tons of fuel, descending by gravity and fed to the furnaces by mechanical stokers. The office building contains a series of laboratories for physical and chemical testing which are equipped with every facility in the matter of apparatus and supplies.

BAKELITE PATENTS DECLARED VALID.

Judge Thomas I. Chatfield, in the United States District Court, Eastern District of New York, on June 12, 1915, rendered decision that three patents of the General Bakelite Co. are valid and have been infringed by the George J. Nicholas Co., of Chicago.

FORD MOTOR CO. TO MANUFACTURE TIRES.

It is currently reported, through authentic sources, that the Ford Motor Co. is experimentally studying the subject of tire construction. Ultimately a tire plant with an annual capacity for 2,000,000 tires, will be part of the new manufacturing center to be built by the Ford company. The site is at Oakwood, West Detroit. Mr. Ford is quoted as having said: "Within fifteen months the automobile tractor plant will be well under way. The five-dollar-per-day scale of wages now operating so successfully at our Highland Park factory will be extended to those working in the new West Detroit plants."

THE NATIONAL RUBBER CO. MOVING TO WILLIAMSBURG.

The National Rubber Co., now operating a factory at Pottstown, Pennsylvania, has commenced work on a new plant at Williamsburg, in the same state, a ten-acre tract having recently been purchased for this purpose. A railway siding to the property, with abundant water supply and free power, are special features of the new location. Present plans provide for a main building 65 x 1,000 feet, with a power house 40 x 40 feet, a machine shop 65 x 120 feet, and an office building 50 x 50 feet, all one story high. As soon as building operations are completed the machinery in the Pottstown plant will be moved to Williamsburg, and considerable additional new machinery will also be required. In the new plant there will be no overhead belting or shafting, all the machinery being independently driven by electricity.

TRADE NEWS NOTES.

The Victor Rubber Co., of Springfield, Ohio, is erecting a second two-story building, 30 x 108 feet, practically duplicating a newly completed addition to its plant.

The Toledo-Ford Tire Co. plans to construct a new addition to its plant at Findlay, Ohio. It will be 50 x 130 feet and four or more stories high.

The Subers Fabric & Rubber Co., of Cleveland, Ohio, of which L. A. Subers is president and general manager, is affiliated by license agreement with The Goodyear Tire & Rubber Co., to manufacture under the Subers patents in the United States, Canada and Mexico. For the past year air brake hose, made with Subers fabric has been used with marked success on several important trunk lines in the East.

The Yoerg Tire & Rubber Co. has had plans prepared for an $18,000 service station on Chestnut street, Holyoke, Massachusetts.

An offer made by the new McClurg Rubber Co. for the property of the S. & M. Tire & Rubber Co. at Coshocton, Ohio, has been accepted and approved by the court, and an order issued to the receiver to sell this property. Appraisers have fixed its value at $66,171.25.

The new plant of the Endurance Tire & Rubber Co. at New Brunswick, New Jersey, is now ready for occupancy. This company has been working, in its old plant, full force and to the limit of capacity for some time past.

The Standard Four Tire Co. is erecting a plant at Keokuk, Iowa, to be equipped for the manufacture of tires, which it expects to have ready for operation about the first of December. W. J. Richards will be superintendent of the new plant. The officers of the company are: President, C. R. Joy; vice-president, C. F. McFarland; secretary, A. L. Higbee; treasurer, A. E. French.

A practical test recently made by The Goodyear Tire & Rubber Co., of Akron, Ohio, demonstrated that rapid driving and exposure of tires to the sun on a hot day, increased the air pressure four pounds over the initial pressure of 80 pounds. This increase is insignificant as regards possible injury to the tires. Under inflation, not over inflation, is the condition to guard against.

In pursuance of its plan for extension, mentioned on page 504 of our June issue, the Fisk Rubber Co. has awarded a contract for the erection of a large modern brick and steel plant at Oak and Grove streets, Chicopee Falls, Massachusetts; this addition to cost $300,000.

The Mishawaka Woolen Manufacturing Co., of Mishawaka, Indiana, has revised its plan for an additional factory building for the manufacture of rubber footwear, increasing the size to 100 x 235 feet, four stories high.

The Boston Woven Hose & Rubber Co., of Boston, whose fiscal year ends August 31, is reported to have made a new record for gross sales during the late spring and early summer months, and is expected to show a handsome net profit on the year's business.

The Electric Hose & Rubber Co., of Wilmington, Delaware, is planning the erection of a new warehouse in that city. The building contemplated is 248 x 31 feet, one story, of brick and concrete.

On January 1 next automobiles will replace the motorcycles in use on 8,000 rural mail routes throughout the United States. A system is also being put into effect by which city delivery by automobile is to be extended as rapidly as possible from all large cities of the country to points within a radius of 25 miles. This will mean a considerable increase in the government's tire purchases within the next year or so.

SCHRADER ADDITIONS AND IMPROVEMENTS.

A contract has been awarded for the construction of a seven-story addition, 100 x 160 feet in area, to the factory of A. Schrader's Son, Inc., of Brooklyn, New York.

This firm, whose recent improvements in tire valves have been noted in these columns, has introduced among the accessory dealers a new container for the washers used inside these valves. This container is damp-proof and dust-proof and is grooved so that each washer is kept separate from the others.

TRADE NEWS NOTES.

The Akron Tire Co., Philadelphia, which deals in Akron-made tires, has brought suit against the Akron Tire Co. of New York, to restrain the latter company from operating in the state of Pennsylvania under its present name. A preliminary injunction has been granted, pending hearing of the suit.

The Aniline Products Corporation has been organized at St. Louis, Missouri, with a capital stock of $12,000, to manufacture chemicals. The incorporators are Clinton E. Udell, John J. Morse, J. D. Johnson and Oliver Frazier.

A new law is being enforced at Cleveland, Ohio, regulating the weight of motor trucks, which, for vehicles having tires less than three inches wide, operating on stone, brick or macadamized roads, must not exceed 3,400 pounds. Permission to operate vehicles of greater total weight over country roads must be obtained from the Board of County Commissioners. A prohibition is placed on vehicles or contrivances having flanges or lugs.

The Standards Committee of the Society of Automobile Engineers will hold an interim meeting at Chicago on October 15.

The National Association of Automobile Accessory Jobbers, which recently met at Chicago for its mid-summer session, will hold a meeting at Excelsior Springs, Missouri, October 20-22.

The Giant Tire & Rubber Co., of Omaha, Nebraska, is soon to open a sales branch at Dallas, Texas.

The United States Rubber Co. is making the fabric for the balloon now being built by the Connecticut Airship Co., of New Haven, Connecticut—the first of the proposed fleet of dirigibles—for the United States government.

The complete line of electric wires, cables and cable accessories exhibited by The Standard Underground Cable Co., of Pittsburgh, at the Panama-Pacific International Exposition at San Francisco, has won for that company a gold medal, the highest award in its class.

The Dreadnaught Inner Tube Armor Co., recently incorporated at Toledo, Ohio, is looking for a site for a factory in which to manufacture tires and a patented inner tube claimed to be puncture-proof.

The Washington Tire & Rubber Co. has purchased a plant at Washington, Pennsylvania, for tire manufacturing purposes. It is expected that work will commence by December 1, with about 150 employees. The plant will be in charge of C. J. Davis, of East Palestine, Ohio.

All the real estate, machinery and stock of the Quality Cement Co., manufacturers of rubber cement at Fernwood, Pennsylvania, near Philadelphia, will be put up for sale on the morning of Friday, September 3.

Among the concerns conspicuous for rapid and remarkable development is the McGraw Tire & Rubber Co., East Palestine, Ohio. This company has recently increased its pneumatic tire production 75 per cent., and is making appreciable progress in its solid tire department. It expects soon to erect a new administration building.

The manufacture of a fountain pen requires 210 distinct operations. In the "Ideal" line, made by the L. E. Waterman Co., there are almost 15,000 different kinds of pens, differing in size, in style and finish and in character of point.

In the litigation between the L. E. Waterman Co. and the Modern Pen Co. regarding the use of the name "Waterman" in connection with the sale of fountain pens, the New York Supreme Court has recently confirmed a former decision authorizing the Modern Pen Co. to continue the use of the name, and has granted an injunction restraining the L. E. Waterman Co. from circulating copies of an injunction obtained by it and from bringing a multiplicity of actions against customers of the Modern company.

The B & R Rubber Co., North Brookfield, Massachusetts, has the distinction of producing in its unique "Armortred" gray rubber a sole that is lighter than leather or any other known rubber sole manufactured. It weighs, size for size, from 25 to 50 per cent. less than the average rubber sole in use. The makers state that repeated service tests have demonstrated that these soles easily outwear leather. "Armortred" and other B & R quality and competitive stocks were specially designed by their chemist, Webster Norris.

UNITED STATES MAIL CARRIED ON RUBBER BELTS.

A system of mechanical conveyors recently installed in the new Post Office at Forty-fifth street and Lexington avenue, New York City, is said to be the most extensive and complete of its kind in the world. Sacks of mail brought by vans or mail cars are taken into the building and delivered to the various depart-

CONVEYOR BELTS IN NEW YORK POST OFFICE.

ments for sorting by conveyor belts. When sorted, the mail is replaced in the sacks, which are then delivered to the waiting vans or mail train by carrier belts—in fact, the sacks are not handled while in the building except by the sorters.

The mechanical carriers which perform this novel service consist of bucket lifts and moving rubber belts. One is a 5-ply belt, 30 inches wide and 500 feet long. Another is 6-ply, 30 inches wide and 800 feet long, and the largest is 6-ply, 36 inches wide and 850 feet long.

The conveying machinery was constructed and installed by the Alvey-Ferguson Co., and the rubber belts furnished by the Cincinnati Rubber Manufacturing Co., both of Cincinnati, Ohio.

THE TRAILER INCREASES TRUCK EFFICIENCY AT SMALL COST.

The increase in efficiency of a rubber-tired motor truck equipped with a trailer has been figured by experts to be 453 per cent., at a 6 per cent. increase in cost. In Detroit, the home of automobile manufacture, many motor trucks thus equipped are in use, and figures from that city show that a five-ton truck with trailer has a load average of 10 tons, in all kinds of weather, and has hauled as much as 14 tons. The trailer idea involves the principle that less motive power is required to drag than to carry a load.

PAUL W. LITCHFIELD.

PAUL W. LITCHFIELD, factory manager of The Goodyear Tire & Rubber Co., Akron, is of New England extraction, having been born—in 1875—and raised in that famous center of culture, Boston. Mr. Litchfield's education was received in the Boston public schools. On graduation from the English High School of that city, he entered Massachusetts Institute of Technology, graduating four years later with the degree of Bachelor of Science in Chemical Engineering.

P. W. LITCHFIELD.

His first attempt to put his knowledge to practical use was in the work of surveying for the Massachusetts Metropolitan Park Commission. After six months of this he entered the employ of L. C. Chase & Co., of Boston, manufacturers of tires and carriage cloth; which was his introduction to the rubber industry. The next step in his acquaintance with the commercial possibilities of rubber came with a transfer to the New York Belting & Packing Co., of Passaic, New Jersey, where he became foreman of the molded goods and packing departments. From here it was but a step to the superintendent's chair of the International Automobile & Vehicle Tire Co., which later became The Michelin Tire Co., and from there to his present position of factory manager of the Goodyear company.

When Mr. Litchfield first became associated with the Goodyear company—on July 15, 1900—the tire industry was still in its infancy. The company itself was less than a year old and employed but 176 men.

When the manager of an immense factory attributes his fifteen years' success to the workmen who have stood by him, one catches in an instant the secret of his control. Belief in men is the key to co-operation. Mr. Litchfield, upon the occasion of a banquet, tendered him recently to celebrate his fifteenth anniversary in charge of the Goodyear factory, electrified the workers present when he announced, in appreciation of the support which the factory organization had given him during these years, the gift of $100,000 in the name of himself and Mrs. Litchfield, as a fund to be used for the benefit of factory employees, and to promote efficiency, team-work and loyalty in the organization.

"These are the essentials to success," said Mr. Litchfield. Urging team-work, he pointed out what it means when an organization works harmoniously. Alone, his efforts would have been largely in vain, but Goodyear co-operation and loyalty had succeeded in increasing the factory fifty-fold.

Mr. Litchfield's letter to the trustees selected by the employees to hold the fund in trust, accompanying his check for $100,000, stipulated that the principal sum should be kept intact for five years, and that at least $50,000 be kept intact for ten years. This to insure wise expenditure.

This paragraph is taken from his letter:

"This fund is given with the idea of sharing with my co-workers a part of the savings which I feel they have shared in producing. Its continued existence in considerable amount should tend to unite Goodyear workers, and give them a sense of responsibility, educating them in business methods, promoting thrift and saving, developing loyalty, efficiency, and co-operation, and cause them to feel that they have something saved up for their use in order to tide them over the emergency of a 'rainy day.' The income may well be used for such things as are not the logical function of The Goodyear Tire & Rubber Co., or other organizations for employees now in existence."

MR. BUSSWEILER BECOMES MR. BOSWELL.

Alfred B. Bussweiler, who has been connected with the rubber trade in London for the last 30 years, and who has long been a loyal and enthusiastic Britisher, has changed his name to Boswell; which is certainly a good old English name with a fine literary flavor. Mr. Boswell is a nephew of the late Max Hecht and founder of the firm of Hecht, Levis & Kahn of London and Liverpool. He first became connected with the rubber trade as a clerk with the Liverpool house of his uncle's firm. In 1892, he entered into partnership with William Symington, who was at that time a rubber broker in Liverpool. In 1895, he became a partner in the Liverpool house of Symington, Bussweiler & Co., and the London house of Alden, Symington & Co. About 1902 he joined Arthur Meyer in forming the London firm of Meyer & Bussweiler, and after a few years this firm was dissolved and Mr. Bussweiler became one of the rubber brokers "in the Lane." A few years ago he joined the old established Mincing Lane brokerage firm of Thompson, where he is at present.

MR. FREDERICO POND REVISITS AMERICA.

After an absence of 39 years, Frederico Pond, lately of Pará, but now of Rio de Janeiro, is revisiting his native country. He arrived early in the summer and expects to remain in the United States until October. There are few men in the rubber trade whose experience compares with Mr. Pond's in extent and variety. He left Salem, Massachusetts, his native city, in 1860, when he was a boy of 18, and went to Pará to become identified with the rubber industry of the Amazon. Barring an occasional visit to this country, the last in 1876, and a good many trips to Europe, he has been in Pará ever since. Foreseeing the crisis which menaced the rubber trade of the Amazon, he retired from business a short time ago and transferred his residence to Rio, a city which he pronounces one of the most delightful in the world.

Notwithstanding his fairly mature years—which may be inferred from the statistics above—Mr. Pond is full of vitality and animation and, it may be added, as full of rubber information as an encyclopedia. Incidentally, when asked if South America was a promising country for young Americans to strike out for, he replied that while many young Americans had done well there his advice to them would be to stay at home, as no land in the world offered the opportunities to young men of energy and capacity that are to be found right here in the United States.

A FAMOUS RUBBER BASEBALL TEAM.

The baseball team of the B & R Rubber Co., of North Brookfield, Massachusetts, seems to be a star team. Last season it played fourteen games and won thirteen; this year so far it has played twelve games and won nine. The team plays practically every Saturday afternoon and on holidays, and these exhibitions of high-class baseball are highly appreciated by the citizens of North Brookfield. For the purpose of raising funds, the Baseball Association gave a cabaret entertainment in the town hall July 30. An interetsing program of songs and instrumental music was rendered by local talent, chiefly employees of the B & R company.

INTRODUCING HARRY M. HOPE.

NOT that he needs introduction to many of the American rubber manufacturers, but more particularly to use a catchy caption; and this is really the important part, to say a word about rubber mill engineers in general and Mr. Hope in particular.

Time was when chemists were unknown in rubber mills. Today there are as many chemists as superintendents, probably more. History is repeating itself in respect to rubber mill engineers. The field is there and it is being rapidly filled, and to the special advantage of the rubber trade. The important field for the engineer is embraced in the economic and engineering features of the generation, distribution and application of power. Frequently great savings can be made in the use of fuel by comparatively inexpensive changes in the boiler plant and the method of firing, based on an accurate analysis of existing conditions. Even greater economies can often be obtained by the application of power to manufacturing equipment in such a manner as to permit the most efficient use of labor and the rapid conversion of raw material into the finished product. All of this calls for special training. That Mr. Hope outside of his rubber mill work has this in abundance is proved by the following brief outline of his activity in the engineering field:

HARRY M. HOPE.

He was born April 13, 1879, at Niles, Michigan, and attended the excellent public schools of Muskegon, Michigan, Northwestern University and Lewis Institute of Technology, Chicago.

His early engineering experience was acquired with the Muskegon Lighting and Traction Co., of Muskegon, Michigan. He entered the employ of the Chicago Edison Co.'s testing laboratory in 1902, and spent one year making power plant tests and reports on manufacturing establishments and the power plants of the company.

In 1903 he was transferred to the engineering department of the Chicago Edison Co., working as an engineer in connection with the design of power stations and electrical transmission and distributing system of the company. In 1904 he was appointed electrical engineer of the North Shore Electric Co., in charge of the design of power stations, sub-stations and electrical transmission and distributing lines, and acted in an advisory capacity in relation to the construction and operation of the entire power, generating and distributing system.

In 1907 he became associated with the engineering department of the Stone & Webster Engineering Corporation, in Boston, and for three years acted as engineer in charge of the design of power plants and electrical transmission and distributing systems. Here he made many investigations and reports relating to the power systems of public utilities and industrial properties. In 1911 he was placed in charge of the engineering department, as assistant to Frederic N. Bushnell, vice-president. He continued in this capacity until March, 1915, when he resigned to establish his own organization of power experts.

PERSONAL MENTION.

Edward B. Aldrich has resigned as vice-president and treasurer of the Intercontinental Rubber Co. and as officer of their allied companies.

D. S. Miller, who for the past four years has been connected with the sales force of the Diamond Rubber Co., in the New Orleans district, has severed his connection with that company and announces his intention of taking a much needed rest, for the present.

Arthur Jones, a director in the rubber brokerage firm of William Symington & Co., of London, England, arrived recently in New York from the Far East en route to London.

Miguel P. Shelley, formerly connected with J. Marques, one of the leading exporters of Amazon products, of Para, Brazil, has recently arrived in New York. He is an expert in South American trade, as he was connected with it, in various ways—chiefly at the port of Para—for 25 years. He is particularly familiar with South American rubber producing. Mr. Shelley expects to remain in New York and connect himself with the South American export and import trade.

E. J. Kane, of 59 Ann street, New York, has been connected with the rubber business, in rather a unique way, for a great many years. He deals exclusively in second-hand articles. He carries a great variety of hose in stock and makes a specialty of fire department hose of every sort. His stock consists entirely of articles that have been used but which have been used so little as to entitle them to further service rather than to relegation to the reclaiming works.

A RUBBER ADVERTISING MAN WINS A HANDSOME PRIZE.

A year ago last spring an association of 40 American manufacturers offered cash prizes aggregating $3,000 for the best ideas submitted which would help them in any department of their work, either manufacturing, selling or advertising. The contest, which was open for a year, closed last May. The awards have been made, and the second prize, amounting to $500, has been given to R. W. Ashcroft, the advertising manager of the Canadian Consolidated Rubber Co., Limited, of Montreal.

THE INVENTOR AND THE PNEUMATIC TIRE.

In commenting recently on the number of letters received daily containing suggestions for the improvement of the pneumatic tire, L. C. Rockhill, manager of the automobile tire department of The Goodyear Tire & Rubber Co., of Akron, states that the prospects are excellent that the present pneumatic tire that we know will remain for an indefinite period superior to the schemes for improving it. He states that the company is able to use about one in every 200 suggestions offered, 90 per cent. of which aim to render the tire puncture proof, usually by means of a metal tread or a metal strip set in the tire. He adds:

"As a matter of fact, puncture-proof qualities, in comparison with other qualities which are imperative, are a minor point in tire construction and are usually obtained by sacrificing some other desirable quality. Our investigations show that on a basis of 100 per cent. for direct wear on a tire, 11 per cent. will represent expense caused by punctures."

SUBSTITUTE FOR EBONITE.

PLASTIC COMPOSITIONS.—W. Plinatus, British patent No. 12,142 (1913). A product resembling horn, ivory or ebonite is made by mixing albumens, such as serum, egg or casein, with an ester of a polyvalent alcohol of the fatty acid series, such as the acetins or other esters of glycerin or polyglycerin. Other substances, such as fats and oils, or sulphuretted oils, resins, pitches, paraffins, camphor, cellulose derivatives, or caoutchouc may be added in dissolved state or otherwise. The mixture may be treated with hardening substances, such as aldehyde, tanning substances or chromium compounds, and coagulable albumens may be hardened by chemical or steam treatment. Filling and coloring substances may be added.

NEW INCORPORATIONS.

Ackerman, Son & Co., Limited, B. F., July 7, 1915; under the laws of Canada; authorized capital, $500,000. Incorporators: Benjamin Franklin Ackerman, William Clair Ackerman, Edward Whitla Borbridge, George Robertson and Jennie Edna Waddell, of Peterborough, Ontario. Location of principal office, Peterborough. To manufacture rubber goods, etc.

Athol Manufacturing Co., July 14, 1915; under the laws of Massachusetts; authorized capital, $200,000. Incorporators: William P. Everts, A. S. Laskey and Edward T. Roche—all of Boston. Location of principal office, Athol, Massachusetts. To manufacture and deal in rubber and rubber goods of all kinds, and machinery, tools, equipment and appliances for the making of rubber goods.

Bell Rubber Co., Inc., August 7, 1915; under the laws of New York; authorized capital, $20,000. Incorporators: William O. Geisman, Anna Geisman and Sarah F. Schroeder—all of 897 Bedford avenue, Brooklyn, New York. To manufacture rubber goods, tires, etc.

Burgamy Tire Co., The, July 22, 1915; under the laws of Ohio; authorized capital, $15,000. Incorporators: Philip Renner, Walter G. Stiles, J. R. Burgamy, Julia Burgamy and Arthur Wood. To deal in automobile tires and accessories, especially McNaull and Nassau tires.

Dupont Rubber Co., Inc., August 2, 1915; under the laws of New York; authorized capital, $25,000. Incorporators: Harry A. Baggot, 504 West One Hundred and Thirty-ninth street, New York City, and Mary L. and William L. Schatz, 217 Fifth avenue, Long Island City, New York.

Hart Sales Co., Inc., August 19, 1915; under the laws of New York; authorized capital, $10,000. Incorporators: John G. Hart, Ocean Parkway and Avenue N, Brooklyn, New York; J. Lawrence Bradlee, North Long Branch, New Jersey, and Laura Barry-Smith, 103 Park avenue, New York City. Rubber clothing.

Los Angeles Rubber Stamp Co., June 14, 1915; under the laws of California; authorized capital, $100,000, divided into one thousand shares of the par value $100 each. Incorporators: G. W. Randall, F. T. Rinehart, G. E. Rinehart, J. W. Rapley and H. A. Osgood—all of Los Angeles, California.

Murrey Spring Tire Co., The, July 20, 1915; under the laws of Ohio; authorized capital, $50,000. Incorporators: H. W. Sisson, F. M. Ossman, John F. Wilson, M. M. Feidner and J. G. Fogg. To manufacture tires and wheels for automobiles.

Narrangansett Rubber Co., July 30, 1915; under the laws of Rhode Island; authorized capital, $50,000, divided into shares of the par value of $100 each. Incorporators: Terrence McCarty, James P. Murphy and Florence F. Sullivan—all of Bristol, Rhode Island. To manufacture, sell, import, export and generally deal in and with rubber, rubber compounds, substitutes for and improvement of rubber, etc.

Perfection Tire Sales Co., The, August 9, 1915; under the laws of Delaware; authorized capital, $1,000,000. Incorporators: F. J. Handel, L. B. Bautz and M. W. Bennett—all of Buffalo, New York. To buy, sell and deal in automobiles, automobile tires, rubber goods and all accessories thereto. Location of principal office is with the Colonial Charter Co., 927-929 Market street, Wilmington, Delaware.

Reliable Waterproof Raincoat Co., August 16, 1915; under the laws of New York; authorized capital, $1,000. Incorporators: Sam Wohl, 100 Avenue C; Sam Mandlowitz, 726 East Sixth street, and David Schneider, 115 Avenue C—New York City. Raincoats.

Schau Airless Tire Co., The, July 3, 1915; under the laws of Michigan; authorized capital, $60,000. Incorporators: Phillip Schau, George W. Morgan and Newman Sanford—all of Kalamazoo, Michigan. Location of principal office, Kalamazoo. To manufacture and sell at wholesale and retail a patented automobile tire, and to manufacture and sell automobile parts and supplies.

Silber & Son, Inc., A. L., August 19, 1915; under the laws of New York; authorized capital, $25,000. Incorporators: Abraham Silber, Isaac Silber and Dora Silber—all of 538 East One Hundred and Thirty-eighth street, New York City. Rubber business.

TRADE NEWS NOTES.

The Philadelphia Rubber Works Co. has removed its New York offices from the Vanderbilt Avenue Building to 1702 Vanderbilt Concourse Offices, at Vanderbilt avenue and Forty-fifth street.

Johnson & Johnson, manufacturers of rubber specialties, etc., for the drug trade, are adding a new building 200 x 500 feet in area, to their already extensive plant at New Brunswick, New Jersey.

The Sussex Rubber Co., of Rutherford, New Jersey, announces that H. A. Middleton and William M. Sharpe are no longer connected with the business of that company.

At the annual meeting of the Continental Rubber Works, held at the company's offices at Erie, Pennsylvania, August 2, the directors and officers of the past year were re-elected. These are: T. R. Palmer (president and general manager); Alexander Jarecki (vice-president); Charles Jarecki (secretary); O. E. Becker, Jacob Roth, James N. Thayer and Fred C., R. K. and Robert Jarecki. Charles S. Coleman is treasurer of the company.

The Gryphon Rubber & Tire Corporation, mentioned on page 622 of our August issue as having been incorporated July 9 with a capital stock of $6,000, we are advised by T. McGiehan, its president, has a capitalization of $600,000. He states that the company, which has offices at 52 Vanderbilt avenue, New York, has purchased land at Bailey avenue and One Hundred and Ninety-second street, on the Harlem river, valued at $30,000, and that contracts have been let for a tire factory, specially designed, wholly of glass and steel, that will turn out over 250 tires a day, and which will cost approximately $30,000.

S. Schein & Sons have purchased a two-story brick factory building, about 119 x 200 feet, at 605-613 Third street, Newark, New Jersey, for the manufacture of a line of hospital rubber goods and druggists' sundries.

On the petition of Lucy H. Stotesbury and William H. Jessup, executors of the estate of the late James M. Stotesbury, a receiver has been appointed for the S. & L. Rubber Co., of Chester, Pennsylvania.

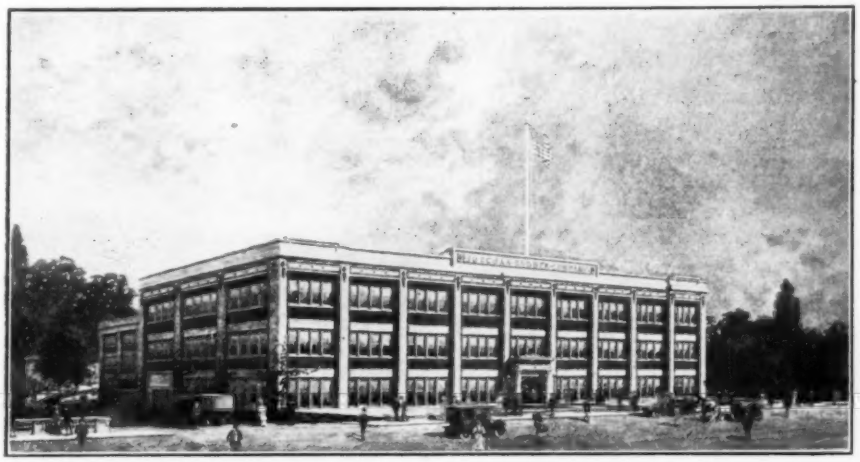
Employees of the Victor Rubber Co., of Springfield, Ohio, held their annual picnic on August 7, at Tecumseh Park, near that city. This was an all-day event, the party leaving the city at 8:25 and returning late in the evening. Amusements and games of all kinds were indulged in, a dinner was served to the employees and their guests, and in addition to the regular band a special orchestra supplied music for the dancers.

In the letter from our Akron correspondent on page 619 of our August issue, the statement was made that the court had dismissed, on a technicality, a petition filed by a stockholder of the East Palestine Rubber Co., of East Palestine, Ohio, that that company be placed in the hands of a receiver. We are informed by the treasurer of the East Palestine company, Mr. B. C. Tunison, that the proceeding was not dismissed on a technicality, but that the plaintiff when forced to a hearing voluntarily withdrew his petition.

Fred L. Summerhayes, of the Canadian Consolidated Rubber Co., Limited, who has been visiting in the Canadian provinces, returned recently to England, in company with J. H. Jamieson, former manager of one of the company's branches. An "Over-seas" division is to be established in Great Britain, comprising branches at London and at Glasgow, Scotland.

THE NEW HODGMAN OFFICE BUILDING.

THE village of Tuckahoe is only three miles north of the New York City line and 16 miles from the Grand Central station on the line of the New York Central road and can be reached from that station in half an hour. It is a very pretty spot, among the hills of Westchester County. The factory of the Hodgman Rubber Co. has been located there for 64 years, and the company recently decided, in order to get more room, light, air and better accommodations generally, to move its show rooms and general offices to Tuckahoe, and to put up a special building for that purpose. The work on this building has been under way for some months. The exterior is now practically completed, as will be seen from the accompanying illustration. The interior will be finished within the next two or three months, and the company expects to move its office force from its present location at 806 Broadway, New York City, to this new building in Tuckahoe by the first of January next.



NEW OFFICE BUILDING OF THE HODGMAN RUBBER CO.

The building is three stories in height, with basement, and stands some distance back from the road. The main portion of the structure has a frontage of 150 feet and a depth of 125 feet. The basement and first floor are to be used for storage and shipping purposes. The goods are taken in at the side and rear, at which points there are covered loading platforms. Adjoining the main entrance on the first floor are reception and waiting rooms, which have a main staircase leading directly to the officers' quarters on the second floor.

A portion of the second floor is to be occupied by the officers of the company and is divided into various rooms for this purpose. The remaining portion of this floor is to be used for the sales and accounting departments. The front portion of the third floor is to be used entirely for offices and the rear is divided into spacious dining rooms for officers and employees, with adjoining kitchen, pantry and store rooms. Comfortable "first aid" rooms with adjoining bedrooms and bath are also provided to take care of any unforeseen illness of employees.

The exterior of the building is made up of a combination of terra cotta, brick, faience tile and concrete, so distributed as to give a very pleasing effect. The main pilasters are of reinforced concrete lined with red brick which extends across the openings and connects with ornamental brick panels under the windows. Terra cotta is used to form the central feature of the front facade extending entirely around the main entrance to the building.

The building is of fireproof construction throughout, and designed along the most modern engineering lines. The frame is entirely of reinforced concrete, including all floors, columns and staircases. All the latest fire protection devices are provided, including automatic sprinklers and stand pipes on all floors. The mechanical equipment throughout is modern in every particular.

It is the company's purpose to maintain a sales office and show rooms in New York City for the convenience of the trade. This office will be connected by direct wire with the main office and the facilities for handling orders will be most complete.

TRADE NEWS NOTES.

At the annual meeting of stockholders of The Faultless Rubber Co., which was held at the company's general offices at Ashland, Ohio, July 30, the former officers and directors were re-elected. These are: T. W. Miller, president and treasurer; P. A. Myers, vice-president; I. L. Miller, secretary; C. E. Campbell, general manager, and F. E. Myers.

The New Castle Rubber Co., of New Castle, Pennsylvania, has increased its output from an initial product of 100 tires a day to 300, and reports that its "New Castle" and "Lehigh" tires are successfully competing in the markets of Pennsylvania and New York, where they have been offered.

A petition in bankruptcy has been filed against the Franco-American Rubber Cloth Co., Inc., of 34 East Tenth street, New York. The liabilities of the company, which manufactured raincoats, are given at $5,000, and the assets at $500.

The Charles A. Klint Co., of Campello, Massachusetts, is said to be negotiating with representatives of the Italian government for a large supply of rubber raincoats for the Italian army, and to have submitted samples of a special design having a long skirt and a hood that fits over the army cap.

The Rubber Division of the National Association of Waste Material Dealers held a regular meeting on August 20 at Atlantic City, at which various important matters were considered.

The Dunlop Tire & Rubber Co. plans the erection in the near future of a $30,000 three-story addition to its factory at Toronto, Ontario.

A new steamship line, of which the Moore, McCormick Co., Inc., is the agent, is to be established between New York and South America. The first sailing will be on September 1, when the steamer "Montara," of about 3,000 tons, will sail from New York for Rio de Janeiro, calling at Pernambuco, Maceio and Bahia.

A committee has been appointed by Secretary of the Treasury McAdoo to arrange a return visit to the South American republics by representatives of the financial, industrial and commercial interests of the United States.

The Goodyear Tire & Rubber Co. about the middle of August completed its withdrawal from the retail field in New York City, discontinuing its store at 1972 Broadway. The company now has in New York, besides its district headquarters and export department at Long Island City, a service station and truck tire department at 207 West Fiftieth street and a mechanical goods department at 30 Church street.

PROPOSED GOVERNMENT PURCHASES.

The Bureau of Supplies and Accounts, Washington, is inviting bids on Navy Department supplies as follows:

September 7, 1½-inch suction hose, schedule No. 8682.
" 7, rubber insulating tape, schedule No. 8672.
" 14, unlined linen fire hose, underwriters' standard, schedule No. 8639.
" 14, suction hose, schedule No. 8722.
" 14, unlined linen hose, schedule No. 8711.

RUBBER TRADE INQUIRIES.

[112.] A European dealer in surgical rubber goods and druggists' sundries inquires for names of manufacturers in a position to supply red rubber sponges, gloves, nipples, etc.

[113.] Inquiry has been received from abroad for addresses of manufacturers of forcing machines for bicycle tubes and gas hose, also molds for bicycle tires.

[114.] Another inquiry is for machinery for the manufacture of hard rubber combs.

[115.] A firm manufacturing rubber goods desires to know where it can obtain supplies of red aristi.

[116.] A European manufacturer of rubber hose is in the market for hose duck, samples of the qualities desired having been sent this office, where they may be inspected.

TRADE OPPORTUNITIES FROM CONSULAR REPORTS.

A druggist in Canada desires information relative to rubber combs. Report No. 17,388.

A firm in Argentina desires quotations and information on rubber heels. Report No. 17,637.

A firm in Portugal desires to export crude rubber. Report No. 17,683.

A machine company in Chile is in the market for tubes for insulating purposes, samples of which may be examined at the Bureau of Foreign and Domestic Commerce at Washington or its branches. Report No. 17,722.

An association in Switzerland would like to establish commercial relations with American manufacturers of all kinds of rubber goods. Report No. 17,750.

A concern in Norway wishes to hear from American manufacturers and exporters of rubber tires, etc., with a view to securing an exclusive agency. Report No. 17,790.

A tobacco importer in Uruguay is in the market for rubber tobacco pouches, on which quotations are asked. Report No. 17,823.

A representative of a business firm with offices in the West Indies and New York states that he is in a position to represent American manufacturers and exporters of mechanical rubber goods. Report No. 17,860.

A South American firm desires to purchase rubber goods. Report No. 17,925.

A concern in France is in the market for rubber erasers, etc. Report No. 17,956.

A manufacturers' agent in Switzerland asks for names and addresses of American manufacturers of transparent nipples, garters, suspenders and other elastic goods, including fruit jar rings. Report No. 18,061.

CONSULAR REPORTS ON FOUNTAIN PENS.

Recent consular reports have contained numerous references to opportunities for the sale of fountain pens. One of these mentions the popularity of the fountain pen in Bohemia, where business men, students and clerks all carry pens of this sort, in qualities ranging from 60 crowns ($12.18) down to 7 crowns ($1.42) each. While pens of German origin have been the largest sellers in the past, those made in England and America have also become quite popular.

In Argentina, where prices range from 42 cents for a pen of Austrian production up to about $6.50, pens of American, English, French, German and Italian manufacture have been introduced.

FRANCE A MARKET FOR AMERICAN RUBBER GOODS.

A loss to the industry of one country may be a gain to that of another. Before the war France purchased on an average about $11,000,000 worth of rubber goods from German manufacturers. Although the rubber industry is well developed in France and French manufacturers are well acquainted with all modern manufacturing methods, France before the war was tributary to Germany for many articles belonging to the rubber industry. When peace is established it is not likely that the low prices at which German rubber goods are offered will be so great an inducement to French purchasers as was formerly the case. Most certainly the French will have a strong aversion for all things German and the $11,000,000 worth of rubber goods formerly supplied by German and Austrian manufacturers will have to be obtained from other sources; for it is not reasonable to believe that the demand for rubber goods will decrease—quite the contrary.

Here appears a chance for American rubber manufacturers to introduce their wares to the French market. No doubt French manufacturers will do their best to obtain their share of Germany's lost trade. So will British, Belgian and Russian rubber manufacturers. But the organization and manufacturing facilities of American rubber factories should enable them to compete successfully in spite of the lower cost of labor in Europe and the high customs tariff that protects French rubber manufacturers in their home market. The following table, taken from "Le Caoutchouc & la Gutta-Percha," shows the latest annual imports of German rubber goods into France:

Description	Value.
Packings (Klingerite type)	$579,000
Rubber sheet	772,000
Rubber sheet (inferior quality—Continental type)	579,000
Hard rubber	965,000
Dress shields	154,400
Rubber erasers	154,000
Suspenders, garters, belts, etc.	135,100
Elastic fabrics	482,500
Card fabrics	67,550
Pneumatic and solid rubber vehicle tires	5,404,000
Rubber footwear (including tennis shoes)	386,000
Asbestos	193,000
Mechanical rubber goods (belts, hose, valves, etc.)	1,351,000
Total	$11,222,550

A CHANCE TO START A RUBBER PLANT IN FRANCE.

An old friend of THE INDIA RUBBER WORLD, located in Paris, writes this publication that a Parisian capitalist who is interested in the rubber industry wants to effect a combination with some substantial rubber firm in a friendly country which desires to establish a plant in France. He offers on his part to furnish a particularly desirable location within a few minutes of Paris in a neighborhood which would supply unlimited labor. He would, at his own expense, put up the proper buildings, and would not ask the foreign firm to furnish a larger amount of capital than he himself is willing to put into the enterprise.

In one of the newest self-applied scalp treatments, where the water or chemical is heated by electricity and applied in the form of a fine spray, rubber tubes are so arranged that by blowing in one tube sufficient pressure is applied to the vapor to distribute it through the other tube to the scalp.

In an improved self-inking stamp called the "Autopad," instead of striking the same spot on the ink pad with each downward motion, the pad, which is 3¼ inches long, is made to move about 1/16 of an inch with each stroke of the handle, so that the rubber face of the stamp comes in contact with a fresh pad surface each time. [The R. H. Smith Manufacturing Co., Springfield, Massachusetts.]

THE RUBBER TRADE IN BOSTON.

By Our Regular Correspondent.

THE summer season, now closing, has been only moderately satisfactory to the rubber trade in Boston. In fact, some lines have been more than usually quiet. Take the garden hose industry. Early orders in advance of the season were hardly up to the average. There was a spirit of conservatism, which proved wise on the part of customers in New England and the Middle Atlantic States, for—because of the very general frequency and extent of the rains this spring and summer—the retail demand has been so small that few or no repeat orders were received. The demand for fire hose has also languished, towns and cities postponing purchases and where buying was necessary cutting their usual orders in two.

Belting is in better demand. Belting leather has jumped to higher prices than ever before known, and this has given an impetus to the demand for rubber belting. There has been a fair business in tires and rubber clothing. It is an off week when we do not hear of some concern entering the rubber sole and heel field. Druggists' sundries are in good call. Makers of fruit jar rings have had a busy season. Mechanicals are most unsatisfactory.

* * *

The Avon Sole Co., of Avon and Brockton, Massachusetts, has made a great success of its soles and heels, which it sells to shoe manufacturers for attaching to leather shoes. The company manufactures its goods of a compound of rubber with ground-up leather fiber, making a sole which, it is claimed, is as waterproof as all-rubber soles, and more durable, also having an anti-slip quality. This concern, which started only a year or two ago, has found it necessary to double the size of its plant at Avon. The enlarged plant will be 300 feet long and 50 feet wide, two stories high, and will have a daily capacity of 12,000 pairs of soles. The factory will be completely rearranged and brought up to the point of highest efficiency. There will be separate rooms for mixing, calendering, molding, pressing, storing and shipping, and there will be a finely appointed laboratory and the usual business offices. The factory will have a spur track to the New York, New Haven & Hartford tracks, to facilitate shipping. This enlargement will be a much needed improvement, for so heavy has become the demand that for the past seven months the factory has been run double time in order to fill its orders.

* * *

The Hon L. D. Apsley, president of the Apsley Rubber Co., has not been much addicted to vacations, but he has lately taken one which was a vacation of the most beneficial kind. He sought out a little village on the Maine coast, far from city noises, electric lights, and even the sound of the motor horn, and there devoted himself to fishing, rowing and sailing. He is now back in his office in Hudson, as enthusiastic and energetic as when he first began making rubber clothing, thirty years ago.

* * *

And that reminds your correspondent that M. T. Bailey, secretary of the Apsley Rubber Co., who has been one of Mr. Apsley's trusted lieutenants for many years, has been very seriously ill for several weeks. He was to spend his vacation on an island four miles from the Maine coast. He had hardly arrived there when he was stricken with a heart trouble, which was the more serious because of the distance from medical help. However, at present writing the anxiety of his friends and family is greatly allayed, as he has materially improved within the last few days.

* * *

Maine seems to have its full share of vacationists this year. J. H. Stedman has just returned from his summer home in that state. A. S. Foster, who has for years boomed Goodyear Glove rubbers in New England, spent several weeks up in the Winnebago region, fishing—and catching fish, too. Francis Appleton, Jr., is at present writing motoring in the White Mountain region, and Manager Porter, of the United States Rubber Co., has just returned from a motor trip in the same locality. M. A. Turner, of the Monatiquot Rubber Co., is up at "Tim's Pond Camp" in the Rangeleys, and Ernest Jacoby is at Friendship, Maine.

* * *

Ernest Jacoby builded better than he knew when, back in 1909, he started the club which has since been incorporated and in his honor named the Jacoby Club of Boston. This club is best described as "a club for men to help themselves by helping others." Its object is to bring back to usefulness men who through intemperance or drug habits, or who through misfortune have become discouraged. How successful has been the work of this institution may be realized when it is mentioned that during the last full year 238 men have been helped by the club, most of whom at one time held good positions but through alcohol or other causes had gradually lost everything worth while in life. There is a club house on Newbury street, open at all times, where weekly meetings are held, and during the summer months outings are given weekly at the Riverside Recreation Grounds. Nearly a thousand men have been helped and enabled to get a fresh grip on life. Though started, with a membership of six, in Emmanuel Protestant Episcopal Church, it is undenominational.

* * *

Travelers along the line of the New York, New Haven & Hartford Railroad, in passing through Canton, day or night, on express or local, cannot fail to see the big electric sign which has recently been placed on the main factory building of the Plymouth Rubber Co., which reads, "The Home of the Slipknot Rubber Heel." The company is doing specially live advertising.

* * *

Charles A. Coe, of the United States Rubber Co., and Chester J. Pike are looking eagerly forward to the date, early next month, when Mr. Kersey Coe (Charles Coe's son) and Mrs. Kersey Coe (Chester Pike's daughter) will arrive from Japan. It may be remembered that young Coe went to Japan as an agent of the Standard Oil Co. Miss Pike, his fiancé, made the long journey a year or two later, and the wedding was held in the American consulate. This visit will be the first vacation Mr. Coe has had since his transfer to the Japanese station.

THE RUBBER TRADE IN RHODE ISLAND.

By Our Regular Correspondent.

THE rubber factories in this state are working well toward full capacity and there are indications that they have orders enough on hand to keep them equally busy throughout the remainder of the year, at least. Factories that were closed a month ago for necessary overhauling and repairs have resumed either on full time or with night shifts. Some of the factories are at present operating on a busier schedule than in several years, and there is nothing to indicate any cessation of activity.

* * *

A deed was filed for record on August 17 at the office of the Town Clerk of Bristol, by which Robert S. Emerson, Trustee in Bankruptcy of the Consumers' Rubber Co. of that town, conveyed to the Narragansett Rubber Co., of Bristol, all the land, buildings, machinery and the entire equipment of the plant formerly owned by the Consumers' Rubber Co.

The Narragansett Rubber Co. was incorporated August 12, 1915, under a charter from the State of Rhode Island, the incorporators being Terrence McCarty, James P. Murphy and Florence F. Sullivan, who also constitute the board of directors.

The officers of the company are as follows: President and treasurer, Terrence McCarty; secretary, Miss Nora Leahy. Mr. McCarty has been in the business of manufacturing rubber goods, especially footwear of various kinds, for many years. He was superintendent of the old Consumers' Rubber Co. plant, which he built up from a small beginning to its present condition, employing about 500 people.

He recently issued the statement that the new company has on hand enough orders for footwear to keep the plant running at its present capacity for a year. For several years, he stated, the business of insulating wire was carried on at this factory, but workmen are now busily engaged in refitting the buildings formerly used for wire insulation for the purpose of making shoes, and when this is completed the number of employees will be greatly increased.

Mr. McCarty, as president, treasurer and manager, is to be assisted by practically the same force of office help and departmental foremen, all of whom have had long experience in the business and manufacturing ends of the rubber industry. The only exception is that of Charles Miller, who has resigned his position as shipper with the concern.

* * *

The International Rubber Co., at West Barrington, has just awarded the contract to construct a large vulcanizer at its plant, and work thereon will begin at once. It is to be of brick with tar and gravel roof and lined with tin. It will be 75 feet long, 24 feet wide and 21 feet high. Work of extending the rails of the New York, New Haven & Hartford Railroad across the highway into the yard of the plant for freight purposes is to be started soon. Other improvements are under consideration.

* * *

The addition to the plant of the Phillips Insulated Wire Co., Pawtucket, will be ready for occupancy early in September. The new structure has been in process of construction for several months. It is to be used entirely for rubber-covered copper wire, the manufacture of which for a long time has been carried on in other departments of the plant. It is of brick and has been erected according to most approved modern methods. Plans are now under way for another new building to be 100 x 70 feet, three stories high, of brick and mill construction.

* * *

Owing to its largely increased output, the management of the National India Rubber Co., Bristol, is trying out the plan of conveying its manufactured goods by auto trucks to Providence, a distance of about 12 miles, to be shipped by boat to New York and points to the south.

The wire insulating business at the National factory is rapidly increasing and additional facilities are becoming necessary to handle this department of the business.

The 50 young women employed at the National factory who board at the DeWolf Inn, which is conducted under the auspices of the company for the accommodation of its women help, were given a complimentary clam bake, on the farm of Colonel Colt, at Poppasquash, one Sunday afternoon in August.

* * *

The Revere Rubber Co. has received permission to erect a one-story frame building on Valley street, this city, for storage purposes.

Several departments of the Revere company are reported to be working overtime at present, making solid tires for heavy trucks.

Thomas Birmingham, a veteran Revere employee, has returned from a vacation to his native town on Cape Cod, which he left 44 years ago, since which time he has never taken a day off from work. He left the "Cape" to accept a position with the old Richmond Land Co., which formerly owned the land upon which the plants of the Revere Rubber Co. and the Queen Dyeing Co. now stand. Since that time he has been in the employ of one or the other of these three companies. His position for many years has been that of watchman for the Revere company, and, with one exception, he is the oldest employee of that concern.

* * *

Robert S. Emerson, of Pawtucket, Rhode Island, trustee in bankruptcy of the Cataract Rubber Co., of Providence, entered suit in the Superior Court for Providence County, on August 13, against Samuel J. Greene, of Providence; William J. Bullock, of New Bedford, Massachusetts, and Clarence H. Broley and George Kirk, of North Providence, to recover certain money that he claims was paid on a note made by the defendants as directors of the Cataract Rubber Co., May 5, 1914.

The plaintiff alleges that the defendants as such directors made a promissory note for $5,500 payable to the order of George Kirk, and endorsed by each of them. On October 5, the sum of $1,000 was paid on this note, it is alleged, by the Cataract Rubber Co. On the ground that it was an illegal transaction the trustee in bankruptcy is suing to get back the money so paid.

* * *

The Bourn Rubber Co., Providence, is working full time at present and is reported to have enough orders to keep it going for some time to come.

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The Davol Rubber Co., Providence, is making surgical supplies which, it is reported, are going to the Red Cross forces abroad.

* * *

An ornamental wire fence has been erected by the American Electrical Works and the Washburn Wire Co., along the railroad front of the two concerns at Phillipsdale, in East Providence. The fence is designed to prevent their employees from leaving the plants and walking on the railroad tracks, where numerous accidents, several of them fatal, have occurred in the last few years.

* * *

Colonel Samuel P. Colt, president of the United States Rubber Co., is preparing to erect at his 400-acre country home at Poppasquash, Bristol, the largest poultry building in this part of the country. There will be accommodations for thousands of fowl, including hens, ducks and peacocks. Different breeds of poultry will be installed and the new house will be erected in close proximity to the $75,000 barn that is now nearing completion.

* * *

H. C. Wagner, superintendent of the Woonsocket Rubber Co. mills at Woonsocket and Millville, with his family, has been spending a two-weeks' vacation at York Beach, Maine.

THE RUBBER TRADE IN TRENTON.

By Our Regular Correspondent.

THE Empire Rubber & Tire Co. has received a contract to supply all the tires used on New York's motor driven fire apparatus during the next six months. The fact that Empire tires met the rigid specifications demanded by the Metropolitan fire commissioners, is in itself a high testimonial to the worth of the product, and the Empire people are naturally proud of the distinction. Empire made hose is extensively used by the New York fire department. The last order was for 30,000 feet of cotton fire hose, rubber lined.

General C. Edward Murray, of the Empire company, recently entertained a distinguished party on board his yacht "Virginia." Chancellor Walker and Vice Chancellor Backes were included in the list of guests. After witnessing the boat races on Barnegat Bay the party went to Atlantic City, returning to Seaside Park by the outside route.

* * *

Vice Chancellor Backes in the Court of Chancery has declined

to name a receiver for the Trenton Scrap Rubber Co. Application for a receiver was made by Harry Freedman, a partner in the company, who alleged irregularities in the financial management of the company.

In refusing to name a receiver the vice chancellor required Isaac Fineberg, the other partner, to give a bond of $50,000, so that receipts and expenditures may be accounted for pending the settlement of the disputed points at issue. Fineberg has filed a cross petition in which he asks that Freedman be compelled to live up to the terms of an alleged agreement for the sale of his shares in the business.

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The Luzerne Rubber Co. has contracted for a sprinkler system to be placed throughout its plant.

* * *

The William R. Thropp & Son's Co. has taken possession of its new addition, which gives an extra working space of 61 x 125 feet. The company has a big list of orders and the outlook for the future is excellent.

* * *

The Delion Tire & Rubber Co. is making a black and white tire which has already met with a big demand.

* * *

A new outlet for inner tube seconds has been discovered along the Jersey coast bathing resorts. Bathers are using them by the hundreds as improvised "water wings." The tubes are inflated to as great a pressure as they will stand. The bather then adjusts the tube so that it rests against the back of his neck and the small of his back. The arms extending through the tube hold it in place. The bather after adjusting the tube may actually recline upon the water and can ride the breakers with perfect ease.

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Charles J. and Nicholas Ribsam, Trenton young men, have gone to South America to conduct investigations upon industrial lines. It is said they will pay particular attention to the rubber trade and report on plantation possibilities.

* * *

The first annual outing of the Essex Mutual Benefit Association, composed of employees of the Essex Rubber Co., was held recently at Burlington Island Park. It was a huge success. Those who participated are already making enthusiastic plans for next year's outing. The large steamer "Twilight" was chartered to take the happy excursionists to the scene of their frolic. The baseball game between the factory and office nines was the event of the afternoon. A feature of the outing was the appearance of the "Outing News," in the form of a special edition of the factory paper.

* * *

The John A. Roeblings' Sons Co. is erecting factory buildings 61 x 456 feet, 131 x 386 feet, 61 x 358 feet, and 58 x 89 feet, all two stories, of brick and steel construction, estimated to cost about $150,000.

THE RUBBER TRADE IN CHICAGO.

By Our Regular Correspondent.

GENERAL conditions in the rubber trade here during the past month have shown some improvement. In the mechanical rubber line some apprehension is now felt on account of the heavy rains throughout the western grain producing section, which threaten to reduce the crops as much as 40 per cent. in some instances. The bad weather in this vicinity during the past month has discouraged automobile travel, and as a result the tire people are complaining; but the firms which deal in rubber clothing declare that they have done a good business, and on the whole are well pleased with the outlook for the season.

The rubber trade was gratified early in the month at the announcement of a settlement of the strike in the building trade, which for more than thirteen weeks had held up all construction work in the city. Since the men have returned to work there has been a marked increase in the demand for rubber matting, fire hose, tile, and the other articles handled by the rubber merchant.

* * *

The Quaker City Rubber Co. is remodeling its quarters on West Lake street, near Fifth avenue, and the interior will present quite an improved appearance when the workers are through, according to Manager A. Romain. The walls are being recalcimined in a color which will reflect more light.

* * *

The New York Belting & Packing Co. is now well settled in the fine new building recently completed at 124 and 126 West Lake street. There can be no question as to the advantage of the new location and the additional room is a boon to the company, which was rather cramped in the old quarters. One of the most striking features of the new building is the expansive plate glass front, which gives light to all parts of the store.

OUTING OF THE ESSEX MUTUAL BENEFIT ASSOCIATION.

band struck up a lively tune as the flag of the organization with the familiar "S X" in white letters centered in a blue field was raised aloft on the boat. The merry makers arrived at the park about 9 o'clock in the morning and after the badges had been distributed a day of rare sport was begun. Special games were arranged for the children of employees, under the supervision of Mrs. W. E. Sanders, wife of the firm's advertising manager. The card of athletic events was a varied one and the different numbers were successfully carried out, among them being interspersed comedy features, such as three-legged races, etc. A

Rubber men of the city took a great interest in "market week," which was celebrated here during the first week in August. Windows generally were decorated with signs put out by the Chicago Association of Commerce, "Made in Chicago." Hundreds of buyers were in the city, among them many merchants who were interested in the rubber business and who left substantial orders with local concerns. During the week the annual convention of the Retailers' Commercial Union was held in the city, its members taking active part in the festivities.

THE RUBBER TRADE IN AKRON.

By our Regular Correspondent.

THE month just passed has been marked by a continuation of vigorous output and development among the rubber manufacturing companies of Akron. Twenty-four-hour operating schedules are common, particularly in the factories turning out automobile tires. Several new tire companies are preparing to manufacture in Akron or nearby sections. Together they will strengthen materially the importance of this city as the center of the American rubber manufacturing industry. In Akron alone the factory extensions projected or under construction at present, total a value of $2,000,000 for buildings, exclusive of equipment. Three-quarters of this valuation is credited to the Goodrich, Firestone and Goodyear companies and the balance to the Miller, Kelly-Springfield and Swinehart companies. This is making no allowance whatever for the investment by the new rubber manufacturing enterprises announced.

* * *

Suit has been brought in the United States District Court for the District of Connecticut at Hartford, by The B. F. Goodrich Co. against the Norwalk Tire & Rubber Co. of Norwalk, Connecticut. The complaint alleges that the Norwalk company is making tires so like the Goodrich cord tires as to infringe the Goodrich trade rights. The usual injunction and damages are asked for.

The new building now under construction for the Goodrich company will be devoted to the shoe manufacturing plant and will cost $250,000.

B. G. Work, president of The B. F. Goodrich Co., returns about September 1 from a trip to the Panama-Pacific Exposition.

A. H. Marks, vice-president of the Goodrich company, is having erected a barn 30 x 100 feet for the accommodation of a considerable addition to his dairy herd at "Elmcourt." Mr. Marks is also having built a large dwelling for the occupancy of the people employed on his farm.

* * *

The Firestone Tire & Rubber Co. will install equipment to furnish its own electric lights and power.

There has been an unprecedented demand for motorcycle tires, and the Firestone company has increased its manufacturing facilities in this line. Much stress has been laid on the endurance of these Firestone tires as a factor in successful racing service.

* * *

President F. A. Seiberling, of The Goodyear Tire & Rubber Co., has been made a member of the American Aeronautic Engineers.

The Goodyear Service Pin Association will be incorporated with a capital of $10,000, for the purpose of administering the fund recently donated by Factory Manager Litchfield. In addition to Mr. Litchfield, the incoporators are the following Goodyear men: Fred Colley, A. B. Cunnington, F. G. Hills, Al. Huguelet, Ed. Huguelet, G. M. Spaulding, G. E. Swartz and E. D. Viers. Each member will be issued as many shares of stock at $10 a share as he holds service pins. A pin is given for each five years of service with the company.

Ralph H. Upson, of the Goodyear company, has been selected a member of the special committee to co-operate with the United States Naval Advisory Board in its consideration of the application of air craft to warfare.

The Goodyear company has established a sales branch in Manchester, England.

All Goodyear branches are to be equipped with suitable hydraulic presses for applying their S. V. truck tires. These tires are pressed on the wheels under a minimum pressure of 25 tons and require no other attachment.

During the first six months of 1915 the Goodyear company produced 3,700,000 feet of hose, equivalent to their entire hose production for 1914.

The Kelly-Springfield Tire Co., after 18 years of litigation, has finally won its suit against the Diamond Rubber Co. of New York, for infringement of the Grant patent [No. 554,765, expired February 18, 1913] which covered the standard two-wire solid vehicle tire.

The award to the Kelly-Springfield company, which includes costs, damages and special fine, totals $212,376.29. Early settlement is anticipated in several other parallel cases which are now in the accounting stage.

Kelly-Springfield Tire net earnings for the first half of 1915, after allowance for bond interest and preferred stock dividends, show approximately 25 per cent. for the common stock.

* * *

The Mohawk Rubber Co.'s new four-story building, costing $30,000, will soon be completed, practically doubling the present capacity.

A rubber plant is to be built on a site in East Akron recently purchased by M. O'Neill. It is proposed to capitalize the new company for $200,000, for the manufacture of tire accessories.

The Standard Tire & Rubber Manufacturing Co., Mark Gillen, president, is manufacturing automobile tires and tubes at Willoughby, Ohio.

The Giant Tire Co., of Akron, has equipped a plant for the manufacture of automobile tires.

The Falls Rubber Co., of Cuyahoga Falls, Ohio, has nearly completed a factory building with an area of 64,000 square feet, at a cost of $85,000.

The Bucyrus Rubber Co., Bucyrus, Ohio, has resumed tire manufacture, under the superintendency of Grant Lambright.

The Adamson Machine Co. reports its plant running 24 hours every day.

The outing season has practically closed. In Akron it has been marked by a number of largely attended and successful occasions generously supported by some of the leading rubber companies for the recreation of their employees. In this connection the following rubber companies should be mentioned: Goodrich, Firestone, Kelly-Springfield, Miller, Mohawk, Swinehart, Rubber Products and Akron Rubber Mold companies.

THE RUBBER TRADE ON THE PACIFIC COAST.

By Our Regular Correspondent.

THE approximate number of motorists in California is 130,000, and they expend annually about $15,000,000 for tires. The average cost of tires for motor cars is $20 each, and the annual consumption, 750,000 tires. The majority of these are manufactured east of Chicago, chiefly by the leading rubber manufacturers. Capitalists familiar with trade conditions on the Pacific Coast might profitably consider the wisdom of venturing rubber manufacturing enterprises to profit by a share in this $15,000,000 annual tire trade, as well as in general mechanical goods lines.

The B. F. Goodrich Co. has practically completed the work of guide posting the Lincoln highway, the last stretch reaching from Denver via Cheyenne, Salt Lake City, Carson City and Sacramento to San Francisco. A thousand posts were required, costing $15 each erected.

* * *

The Midgley Tire & Rubber Co. is making an extensive canvass of California with the view of establishing a series of branch stores to handle trade in goods of its manufacture.

The Squires & Byrne Rubber Co. has recently re-located at 67 Steuart street, San Francisco, dealing in mechanical rubber goods and steam packing specialties. It also has a branch at 438 East Third street, Los Angeles.

The Colorado Tire & Rubber Co. has completed building additions which practically double the size of its plant.

The Dry Climate Tire Manufacturing Co. is erecting factory buildings at Arvada, seven miles from Denver. The company will manufacture tire casings and tubes specially adapted to withstand the dry climate of the Rocky Mountain regions.

A FINE EXHIBIT OF AMAZON RUBBER AT THE SAN DIEGO EXPOSITION.

IT will be remembered what a magnificent exhibit Brazil had at the rubber exhibition in New York in 1912, and Brazil's exhibits at the London rubber shows have also been famous. It was the expectation of the Brazilian government to have notable exhibits at both the Panama-Pacific Exposition at San Francisco and the Panama-California Exposition at San Diego, but owing to the present financial situation in that country, the Brazilian Congress at the last moment concluded not to be officially represented at either of those expositions.

Dr. Eugenio Dahne, however, who was one of the Brazilian commissioners at the World's Fair at St. Louis in 1904, and had been in general charge of the Brazilian exhibit in New York in 1912, and had held the office of Commissioner General to the United States and Canada, representing the Minister of Agriculture, Industry and Commerce of Brazil, had been working for several years to obtain Brazil's participation in the two California expositions and when his government decided not to be represented officially, he determined to arrange for a private exhibit of Brazil's most important products at the San Diego Exposition. With this in view he returned to Brazil last January and succeeded in collecting a large number of exhibits showing the various industries in which Brazil is engaged. He was fortunate enough to secure from the Minister of Agriculture the entire collection of rubber displayed at the exposition in Rio de Janeiro in 1913 and which had been kept intact with the expectation of sending it to the London exhibition held in July, 1914, but which the government later decided not to send.

This Brazilian exhibit at San Diego was officially opened on the fourth of July by the president and other officials of the exposition. It is described by the press of California as one of the finest features of the fair. It occupies a space of 115 feet front by 15 feet deep. Dr. Dahne has divided his exhibit into three sections, showing products from the North of Brazil, from Central Brazil and Southern Brazil. The first section consists largely of a display of rubber from the Amazon. There are five tons of samples of crude rubber, including every variety and shape of crude rubber produced in the Amazon district and adjoining states. There are huge balls and sheets of Sernamby, blocks of caoutchouc, crêpe-sheets and biscuits of Maniçoba and Mangabeira. One case alone contains samples of sixty different varieties. The implements used by the rubber gatherers are also shown, and rude rubber shoes, pouches and clothes bags of rubber made by the natives, while a large collection of excellent photographs explains the different processes of gathering and preparing the rubber.

FRONT OF RUBBER EXHIBIT—AMAZON JUNGLE IN BACKGROUND.

GENERAL VIEW OF THE EXHIBIT.

As a fitting background and setting, there is reproduced a life-like scene of an Amazon jungle, flanked by the reproduction of the two-story native house of the rubber gatherer—the "Roosevelt Cabin," shown in one of the photographs.

The outside walls are bedecked with hunters' trophies, the heads and skins of deer, wild boar, the South American jaguar, the otter, the sloth, monkeys, birds, and other animals, and collections of Indian bows, arrows, clubs and lances.

This whole Brazilian exhibit is particularly fine and has proved exceedingly interesting to all visitors. Considering that Dr. Dahne has brought this great collection together with comparatively little aid and is making this exhibit on his own personal responsibility, it is a monument to his energy and capacity for this sort of work. That his efforts have been duly appreciated, not only by the visitors to the ex-

position but by the juries of award, will be seen by the fact that two grand prizes, two gold medals and four silver medals have been bestowed upon this exhibit; one grand prize going to the Brazilian Minister of Agriculture for his generous loan of exhibits, the second grand prize going to the government of the State of Sao Paulo. A gold medal has been bestowed on Dr. Dahne in recognition of his efforts in assembling this exceptionally fine display. The other gold medal went to the government of the State of Parana, while the four silver medals went to different companies in Para and Rio de Janeiro for individual exhibits.

One of the most interesting days which the exposition has yet seen was on the occasion, late in July, when it was visited by Colonel Roosevelt and party. As the ex-President spent one of the most exciting winters of his life in the Brazilian jungle, he was strongly attracted to the Brazilian department. He was particularly interested in the rubber gatherer's cabin, which Dr. Dahne labeled "Roosevelt Cabin," although it is probably considerably more spacious and comfortable than the quarters which the famous explorer enjoyed while canoeing down the "River of Doubt."

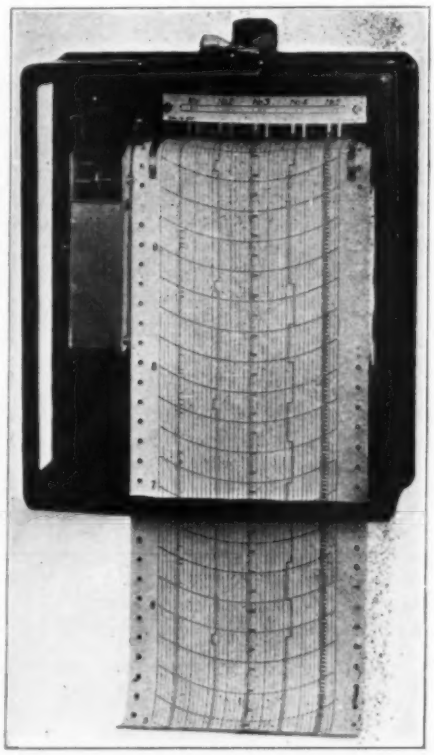
It has been practically decided to continue the exposition another year, and Dr. Dahne expects to go to Brazil in October

COL. ROOSEVELT AND DR. DAHNE (AT THE EXTREME LEFT) IN FRONT OF THE ROOSEVELT CABIN.

with the hope of bringing back even a larger and more complete collection of Brazilian products than he now has. He earnestly hopes that the American manufacturers of rubber goods will also become interested and that his exhibit may include not only samples of crude rubber but a variety of manufactured goods. He would be glad to have any manufacturer interested in the subject communicate with him, in care of the exposition.

A GRAPHIC EFFICIENCY INSTRUMENT.

IT is one thing to establish a standard of efficiency in the operation of a calender, mixer, or a press vulcanizer, but it is quite another to maintain standards in all of the machines used in the manufacture of any line of rubber goods. The speed and temperature of the mixer and calender rolls should not exceed certain limitations. So too in vulcanization, the temperature and duration of a cure should always be the same for like goods. Indeed in most of the other operations in rubber manufacture a uniform product is largely dependent on the exact operation of the machinery. In establishing a system of efficiency the first thing is to be able to measure each machine's output.



The Esterline meter is an instrument which makes a continuous record of the performance of washer, mixer, calender or vulcanizer. Any varying quantity, whether it be speed, temperature, pressure, feet per minute, miles per hour, volts, amperes, kilowatts or horse-power, is registered. The record is written in ink by a pen, on a chart propelled at a uniform rate, and is an exact graphic representation of the quantity measured.

The illustration shows a five-pen service instrument that can be used in recording the operations of rubber mills and calenders. The solenoid controlling each pen is connected with separate terminals on the instrument, and therefore each pen can be controlled separately. Normally the pen will draw a straight line on the paper, and at the moment of closing the contact in its particular circuit, the pen will deflect about a quarter of an inch to the right. It will then continue to draw another line parallel to the zero line until the contact is broken, and if the contact is a fairly quick make and brake the pen will draw a straight line at right angles to the zero line.

The instrument can be located at any distance from the machine under observation. Two wires are carried from the machine to the instrument and a simple contact arranged on the machine closes the circuit at the completion of each revolution, or completion of an operation. [The Esterline Co., Indianapolis, Indiana.]

A new tire and tube vulcanizer has been put on the market which can be operated by the current supplied by the six-volt lighting, starting and ignition system now a part of the standard equipment of many automobiles. A thermostat regulates the temperature for vulcanization. [Corbett & De Coursey Co.]

The India Rubber Trade in Great Britain.

By Our Regular Correspondent.

GENERAL REMARKS.

A TOPIC that is receiving considerable attention at present is the prevention of rubber getting to Germany via neutral countries. There seems to be suspicion in Eastcheap and Mincing Lane that the arrangements made by the War Trade Department and the Tin and Rubber Export Committee with the Netherlands Oversea Trust, are not completely efficacious in preventing rubber from arriving in Germany. A somewhat difficult factor in the case is the Teutonic nationality, or, at any rate, extraction, of many of the Mincing Lane merchants. The Scandinavian countries have certainly been importing much more rubber than has been the case in the past, but it has been pointed out that as their customary imports of rubber goods from Germany have very largely declined, and indeed quite ceased in respect to some goods, and as the British export of goods has not increased, they must naturally buy more rubber and turn out more goods at their own factories. Moreover, as a Danish visitor pointed out to me, traffic that formerly went via Hamburg into Denmark, and did not figure in port statistics, now all goes into the port of Copenhagen.

At a meeting of employers' associations in various trades, convened by the Ministry of Maintenance in Manchester, in July, the India Rubber Manufacturers' Association was represented by Messrs. J. T. Goudie (chairman), P. A. Birley, David Moseley and James Tinto. The result was an official circular, issued to rubber manufacturers generally, asking for particulars as to the skilled mechanics employed, the object being to find out the number who can reasonably be spared for the service of the country for munition work. It need hardly be said that all the rubber works have mechanics shops, and no doubt many men could be spared for a time without impairing the efficiency of the works to any serious extent. Certainly the trade generally is very brisk, work for the various government departments being again much in evidence after a period of comparative quiescence.

SOCIETY OF CHEMICAL INDUSTRY.

The annual meeting—with papers and discussions—which took place at Manchester in July, was of no special interest to the rubber trade. On the proposition of Professor Walker, recorded by B. D. Porritt, chief chemist of the North British Rubber Co., Limited, an invitation to hold the next annual meeting at Edinburgh was submitted and accepted. In contrast with what has become customary of recent years, no members from Canada or the United States were present. Professor H. E. Armstrong, F. R. S., in the course of a paper on "The Development and Control of Industry by Public Influences," said that when in Ceylon last winter, in view of the great importance of the rubber industry and of the small amount which is being spent on research work in connection with it, he had made the proposition that the government should levy an "insurance tax" upon all rubber produced in British possessions, and require that this should be applied to the full scientific study of every particular connected with the industry—the work to be done, however, under the supervision of those concerned in the industry, the task of government to be merely that of enforcing the application of an adequate sum to scientific inquiry. He went on to say that this principle should be extended to many industries. The idea that technical research of various kinds should be carried out at the expense of the industries concerned, and not paid for out of public funds, was evidently the general opinion of the members.

In an excursion to the Trafford Park Estates and Ship Canal, among other works visited were the British Westinghouse Co. and the Ford Motor Co. (England), Limited. At the latter works, where profit sharing with the employees is in full force, the visitors were shown light motor cars being made, with American dash, in record time. To give an instance, the usual time for putting the rubber tires on the wheels by hand is 50 to 60 seconds. The tires are all supplied under a contract with The B. F. Goodrich Co., of Akron, U. S. A., by arrangement with the head office at Detroit. The sizes are now marked only in inches, and not in millimeters, as was formerly the case.

PENCIL MARK ERASER.

I understand that the German schools are using an eraser made from substitute and containing finely ground glass, and that their authorities after a painstaking enquiry have found that no deleterious effects are produced by the dust. An eraser which contains no rubber is now being sold in English stationery shops without any details as to the manufacturer or the country of origin. I find that it contains about half its weight of oil substitute, the rest being zinc oxide and barytes. This is the white variety, it being also sold of a red color. It makes erasures all right, but compared with rubber it soon disintegrates and so has much less lasting power. Presumably material of this sort is not made by mixing substitute and mineral powders on the rolls, but by admixture of the mineral with the oil before it is oxidized.

PERSONAL.

I regret to record the death, on July 27, of Mr. F. T. Swanborough, who had been for some years joint managing director of the Avon India Rubber Co., Limited, of Melksham Wiltshire. Commencing his service 20 years ago under the managership of Mr. Margetson, Mr. Swanborough by his abilities had had a good deal to do with the great development which the concern has witnessed.

NORTHERN RUBBER CO., LIMITED, RETFORD.

Mr. Haslam, who has held an important managerial position under Mr. Pegler, the principal proprietor, has now retired and has been succeded by Mr. Tolson, who has been the chemist for some time.

NORTH BRITISH RUBBER CO., LIMITED.

The new mill at the works which is to be devoted to tire manufacture is making good progress. The works of the old Scottish Vulcanite Co., which is now owned by this rubber company, are fully engaged on government work, the admiralty requiring large quantities of vulcanite slabs for special purposes. Outside of this works no very great advance seems to have been made in making up the deficiency in vulcanite goods formerly imported from Germany. One point about competing with Germany in vulcanite is the price. I am told that there is some secret about the cheapest German product that our manufacturers have not been able to fathom. Tobacco pipe manufacturers have bought German vulcanite fittings largely in the past, and though they can, as they inform me, get their supplies now at home, it is only at a considerably higher price. But to return to the North British company, not only in vulcanite but also in celluloid the firm is going ahead. This latter department is only in its infancy, but great progress has been made. Celluloid is only made at one other works in Great Britain, and that is the British Xylonite Co. in Essex. The already extensive laboratory accommodation of the North British company is shortly to be enlarged by the addition of a research laboratory, considerable attention now being paid to aeroplane fabrics. Mr. R. Wheatley of the scientific staff has given up his position and is now a lance corporal in the scientific corps of the Royal Engineers.

RUBBER CHEMICALS.

The high price to which spelter has soared has of course meant a considerably increased price for zinc oxide at the rubber works,

many of which are now using lithopone to a much greater extent than formerly. A good deal of American zinc oxide is being used in Great Britain. With regard to the quality of this compared with the Vicille Montague brands, the rubber works are unanimous that it is not so good, owing to the presence of small quantities of other metallic oxides. On the other hand an eminent zinc expert who is familiar with the works in New Jersey tells me that the zinc oxide produced there is quite as pure as the best Vicille Montague. One is therefore forced to the conclusion that some if not all of the rubber manufacturers in Europe are getting a second grade product, while the very best is either retained for American consumption or goes to a favored few. Or again it may be purely a matter of price and that the highest quality can be obtained by all who will pay for it. Quite recently a new zinc oxide works has been started not so very far from London. The process adopted is that of the Vicille Montague company, viz., burning the metallic zinc, and I am not surprised to hear that the works are extremely busy with orders from those who require the very highest quality.

British barytes producers, stirred up by officers of the Geological survey and officials of the Board of Trade, are actively engaged in filling the void caused by the cessation of German supplies. We have the raw product in abundance, but largely owing to lack of technical skill in grinding and finishing, and to absence of special freight terms, the German product had obtained a good hold in this country, both as regards quality and price. British rubber works are now using the home product, but they are paying a considerably higher price than they used to pay for the German. It remains to be seen what will happen after the war, but it would certainly seem that having the raw material at hand we ought to have no difficulty in bringing our production of the properly finished product up to the mark.

RUBBER TIRES INCREASE EFFICIENCY.

That rubber tires increase the efficiency of steam trucks, is a statement made by the president and general manager of perhaps the largest hauling and trucking concern in England, which uses an immense fleet of steam-propelled trucks. Some of these are equipped with steel and wooden plug tires, and some with solid rubber tires, and they find that the latter make their steamers far more efficient.

TRADE NOTES.

The Peerless Seamless Rubber Co., Limited, has been registered in London, with a capital of £2,000, with offices at Station Road, Richmond, Surrey.

Imports of wires and cables—rubber and other insulations—into the United Kingdom, from all countries, in June last, amounted to $21,398; while exports of similar goods for the same month were valued at $348,480.

The Council of The Rubber Growers' Association, of London, at a meeting held July 26, appointed a special committee to further consider the questions of dealings in rubber with men of hostile origin and shipments of rubber to neutral countries.

The general manager of the Dunlop Rubber Co., Limited, of Birmingham, England—the Hon. Mr. Muirhead—has recently been making a tour of Ceylon in the interests of the company.

The British Insulated & Helsby Cables, Limited, of Helsby, England, has recently erected a building set apart for female operatives. Light machines for the main works have been installed there and girls are being trained systematically as operators, due to shortage of male labor, owing to enlistments. The company is busy manufacturing power feed cable and has transferred some orders to the United States.

The Russian Government advises that certificates of origin will no longer be required for importations into the Empire of rubber and gutta percha

BRITISH IMPORTS OF GUTTA PERCHA.

The following table shows a comparison between British imports of crude gutta percha during the years 1913 and 1914.

	1913.		1914.	
From—	Pounds.	Value.	Pounds.	Value.
Straits Settlements	5,115,600	$2,687,929	1,670,100	$836,565
British Guiana	963,300	643,478	795,000	517,367
British West Indies	71,000	47,426	77,000	47,852
Other British	142,400	44,193	84,600	21,933
Total British	6,292,300	$3,423,026	2,626,700	$1,423,717
Venezuela	2,372,400	$1,547,211	974,600	$569,531
Dutch Guiana	930,000	774,960	239,100	184,942
United States	469,500	276,573	638,100	371,640
Germany	494,200	285,975	303,600	188,528
Other foreign	565,600	362,549	456,000	281,250
Total foreign	4,831,700	$3,247,268	2,611,400	$1,595,891
Grand total	11,124,000	$6,670,294	5,238,100	$3,019,608

The great proportion of the gutta percha shown in the above table as imported from the Straits Settlements came originally from the Dutch East Indies, having come to the Straits Settlements for re-shipment.

FRENCH IMPORTS AND EXPORTS OF CRUDE RUBBER AND RUBBER GOODS.

The following table shows the weight in pounds, together with the value in dollars, of the imports of crude rubber and rubber goods into France, and also the exports, during the calendar year 1914 and the first four months of 1915.

	1914			
	IMPORTS.		EXPORTS.	
DESCRIPTION.	Pounds.	Value.	Pounds.	Value.
Crude rubber	25,448,280	$15,716,762	14,276,460	$8,817,205
Non-vulcanized pure rubber sheet	170,280	261,515	18,480	24,511
Vulcanized rubber thread	240,460	379,631	.....	.....
Elastic fabrics	154,220	270,586	319,660	524,381
Rubberized fabrics in pieces	86,020	90,517	64,680	67,550
Dress shields	27,940	68,531	1,320	965
Suspenders, garters, belts, etc.	9,240	24,318	.....	.....
Rubberized garments	52,580	101,518	117,040	218,283
Rubber footwear	165,220	101,518	100,760	60,023
Tire casings, inner tubes, solid rubber tires, etc., for cycles, automobiles and motor trucks	1,756,480	2,696,596	10,081,940	14,284,123

	Four Months 1915.			
Description.	Pounds.	Value.	Pounds.	Value.
Crude rubber	7,335,900	$4,530,675	1,164,680	$719,311
Non-vulcanized rubber sheet	23,370	35,898	.....	.....
Vulcanized rubber thread	72,820	115,028	.....	.....
Elastic fabrics	35,200	61,760	165,880	272,130
Rubberized fabric (in pieces)	39,160	41,302	2,420	2,509
Dress shields	220	579	.....	.....
Suspenders, belts, garters, etc.	1,100	2,895	.....	.....
Card fabrics	22,540	8,878	4,840	3,667
Rubberized garments	29,700	57,321	62,040	115,607
Rubber footwear	1,354,100*	831,637	11,220	6,755
Solid and pneumatic tires	182,160	279,657	1,818,520	2,576,550
Total	9,096,270	$5,965,630	3,229,600	$3,696,529

(*Does not include 1,078,000 pounds of rubber footwear imported by the government for army purposes.)

THREE PIRELLI BROTHERS AT THE FRONT.

A personal letter received a few days ago from A. Pirelli, of Pirelli & Co., Milan, Italy, by a New York friend, states that his three brothers are at the front with the Italian troops while he has been commanded by the military authorities to oversee certain operations for the government now being carried on at his works. He writes as follows:

"I am commanded at the works, where we are working day and night for the supplies to the army and navy—several of our departments having also been militarized—but my three brothers have all joined the colors, my brother Piero, who is also one of the managing partners of our firm, being attached to the staff of the Commander-in-Chief, and my two young brothers being both in a cavalry regiment, but one of them is now going to enter the Aviation Corps."

Rubber plantations in Selangor, Federated Malay States, show a material increase over last year. The total area under rubber amounts to 245,503 acres.

The Rubber Trade in Germany.

By Our Regular Correspondent.

WHEN the war broke out German business circles recognized that the extraordinary conditions it created would have a far-reaching effect on the commercial and industrial life of the empire. But there still seem to be a good many people in Germany who have not yet been impressed with the changed conditions, and among them are quite a number of dealers in the rubber trade, who complain very loudly that the manufacturer does not turn out their orders as acceptably and as rapidly as he would in normal times. The rubber journals are taking these complainers to task, and seeking to convince them that under present trade conditions they should make all proper allowances for the extraordinary difficulties under which the manufacturer labors, and that they should not be too insistent on immediate deliveries or on getting exactly the quality at precisely the price mentioned in their orders.

The Allies' blockade is being felt more and more each day, and the list of rubber goods "no longer obtainable" is increasing constantly. Each day increases the inconveniences created by the lack of raw materials, and the discovery, or even the pretended discovery of some new substitute, for a scarce or "no longer obtainable" raw material is heralded throughout the press. It was announced lately that the Kaiser had motored to the front in a machine equipped with artificial rubber tires. Immediately the press announced that the great problem had been solved, that artificial rubber was at last practicable, that Germany would no longer have to rely upon foreign countries for her crude rubber supplies. Rubber would now be home-made. It appears, however, now that the much talked of artificial rubber tires of the Kaiser's automobile were only experimental ones, produced at great cost, or at least at a cost that would prohibit their being produced on a commercial basis, or even on a basis permitting their use for the present military needs.

Another substitute that is receiving wide publicity in Germany appears to offer greater possibilities. It is known as "textilose," and is to be used as a substitute for the jute Germany formerly imported in great quantities from British India.

Textilose is made by spreading paper on a fiber gauze and cutting the product in strips, which are then spun into a yarn and can be woven in a similar manner as other paper yarns. Two factories are said to be producing about 44,000 pounds of textilose bags per day, and it is also stated that over 40,000,000 marks ($9,520,000) have been subscribed for the promotion of the manufacture of this jute substitute both in Germany and abroad.

Speaking of textiles it is interesting to give the following table, which shows the extent to which Germany was dependent upon foreign lands for her supply of these raw materials. These statistics are for 1913, which was the last complete statistical year:

Articles.	Origin.	Value.
Cotton	United States, India and Egypt	$139,777,400
Wool	Australia, Argentina and Cape Colonies	87,798,200
Jute	East Indies	18,088,000
Flax	Russia, Austria-Hungary	18,088,000
Hemp	Russia, Italy	10,710,000
Ramie	China	547,400
Manila hemp	Philippine Islands	499,800
Sisal hemp	Mexico	362,200
Raw silk	China, Italy	47,400,000

When the war broke out there was a very large supply of cotton, and even after the beginning of hostilities, large quantities of raw cotton from time to time reached Germany. Manufacturers used freely of this supply, with the result that when the Allies tightened their effective blockade the supply of raw cotton was considerably depleted. Since August 1 the manufacture of cotton goods has been absolutely prohibited. The government's order is far reaching and strikes all kinds of goods made of cotton or containing any of this staple. Without distinction it prohibits the manufacture of all cotton yarns, cotton threads, fabrics, wearing apparel, bags, belts and all woven or knitted goods containing cotton. Since August 1 it has been legal to use cotton only in the manufacture of military requisites. Long before the government decided on these restrictions the price of raw cotton had reached the alarmingly high price of 30 cents per pound. The efforts made to encourage the planting and harvesting of hemp and flax have not yet given any material results.

Another government operation of great importance to the rubber industry is the recent seizure of all supplies of sulphur. However, the seizure of the sulphur supplies is considered an advantage to the rubber trade, for the government has promised to distribute sufficient quantities to answer the immediate needs of all.

Lubricating oil is becoming so scarce and its price so high that only few rubber manufacturers can afford to use it for their machinery. Even graphite, which is used as a substitute therefor is becoming rare and expensive.

The Allies' blockade has created such a rubber, gutta percha and copper famine that the D. V. E. (Union of German Electrical Engineers), which fixes the standards for rubber and gutta percha insulated wires, has been obliged to modify its standards to make their observance possible under present conditions. As far as possible iron will be used instead of copper and rubber and gutta percha insulations will be replaced by impregnated paper wherever practicable. In cases where impregnated paper cannot be used, reclaimed rubber will take the place of the usual insulator until normal conditions are re-established.

The war has increased interest in farming here, and farmers, owing to lack of labor, are obliged to use modern machinery to a much greater extent than they formerly did. This creates an unusual domestic demand for many rubber mechanical articles, and especially for belts, in view of the fact that the use of leather for other than military purposes is strictly forbidden. But, because of the high cost of raw materials necessary for making these belts, it is almost impossible for manufacturers to make reasonable profits in producing these necessities. Of course those who had a large stock of belts on hand are securing large profits, for farmers are glad to take what they can get and are using all sorts of belts on their threshing machines and other agricultural implements.

Packings and the like that can easily be made of substitute materials are giving but little trouble. The hose industry generally speaking is dead. No orders are forthcoming; people who use hose are doing the best they can by keeping their old hose in repair.

Before the war, maritime as well as river navigation offered a great market for all sorts of mechanical rubber goods. River navigation is at a standstill through lack of freight and lack of hands; maritime navigation, as far as Germany is concerned, is stopped almost entirely by the activities of the Allies' fleets.

In a word, the rubber industry here is badly affected by the war, and were it not for government orders for tires and

other mechanical and surgical rubber goods, the whole industry would be at a dead standstill.

THE GERMAN SYSTEM.

As an illustration of the thoroughness with which the Germans conduct their military operations, a paragraph in a letter recently written from northern France is interesting. The writer says:

"After every battle in which the Germans have been victorious the field is literally scoured, and all the junk is transported to headquarters. Scores of ripped and torn auto tires are collected and sent to an establishment where the rubber can be utilized in the making of new tubes."

GERMANY SAVING EVERY SCRAP OF RUBBER WASTE.

The saving of every possible scrap of waste rubber has now become such an important matter in Germany that not only the imperial government but state and municipal authorities have taken the matter up; and the Red Cross organization particularly is instructing the public in regard to collecting old rubber articles so that nothing shall be missed. The newspapers even go to the extent of giving general instructions as to how waste rubber articles shall be sorted before being turned over to the factories for use, so that the delay of re-classification may be avoided.

On June 1, Austro-Hungarian rubber manufacturers increased their prices for rubber goods from 50 to 100 per cent.

RUBBER FAMINE IN DENMARK AND IN SWEDEN.

For a long time Danish rubber imports have been restricted by Great Britain lest some of these imports find their way to Germany, in spite of the Danish embargo on rubber exports. This resulted in a rubber famine in Denmark. Now that Danish rubber manufacturers have assured England that they would not allow the Danish embargo to be violated, the British government is allowing Denmark sufficient rubber for domestic needs. Sweden has refused to place an absolute embargo on rubber exports, and great Britain's restrictions on rubber shipments to that country are therefore maintained, with the result that the rubber shortage is becoming acute in Sweden.

The cargo of the Swedish steamer "Fridland," recently seized by the British on the way from New York to Copenhagen, Denmark, included 56 tons of rubber, marked on the cases and entered in the bill of lading as "gum."

The scarcity of rubber in Norway is said to have led to the withdrawal from service of many public as well as private automobiles and to the opening of negotiations by the Foreign Office and the Royal Automobile Club with the British government for the purchase in London of limited quantities of rubber.

IMPROVEMENT OF PLANTATION HEVEA.

The *Hevea Brasiliensis* tree shows much variability in the rubber plantations of Malaya and the officials of the Botanic Gardens, Singapore, are attempting to mark the best among the old trees that they may serve as parents for improved stock. The work of selection will cover many years. It commences with the comparison of tree with tree as judged by the yield of latex.

PLANTATION RUBBER.

It is very probable that this year's exports of plantation rubber will exceed the totals of all previous years. For the first three months of 1915 statistics show that crude rubber exports from Malaya and Ceylon to Great Britain, in spite of the war and the consequent shortage of shipping facilities, exceeded those of the corresponding period of 1914 by 7,940 tons.

SOME RUBBER PLANTING NOTES.

RUBBER EXPORTS FROM BRITISH MALAYA.

THE London "Financier" gives the following table showing the quantity and value of exports of rubber from Malaya during the past nine years:

	Exports. Tons.	Average Price per Pound.	Total Value.
1906.....	430	5/0	£240,800
1907.....	885	4/6	446,040
1908.....	1,629	4/0	729,892
1909.....	3,340	7/0	2,618,560
1910.....	6,504	6/0	4,370,688
1911.....	11,500	4/0	5,172,000
1912.....	21,305	4/0	9,548,901
1913.....	35,352	3/0	11,872,224
1914.....	46,047	2/0	10,314,668

Comparatively little has been added in the last two years to the area under rubber in British Malaya. Three years hence all the trees on the plantations should be in bearing, but although this will mean a great increase in supply, little fear of overproduction is felt among Malayan planters, who believe that rubber will always be in sufficient demand to command prices affording a reasonable margin of profit.

PRODUCTION OF OLD HEVEA TREE.

Bulletin No. 13, Department of Agriculture, Ceylon, gives particulars of the tapping of an old *Hevea* tree at Heneratgoda. It is one of the original seedlings sent from Kew and planted in 1877. It stands close to a hard road and with two other trees within fifteen feet of it. In less than five years it yielded nearly 400 pounds of rubber.

A tapping test was begun December 5, 1908, and continued daily on a full herring-bone system of three V's, the cuts being one foot apart and the lowest cut one foot from the ground. The fourth section was completed January 17, 1911. The yields from these four sections were as follows:

	Days tapped.	Total rubber. Lb.	Oz.
Section 1.....	153	43	9
Section 2.....	185	43	7
Section 3.....	137	34	13
Section 4.....	125	50	3
Total	600	172	0

Tapping on the renewed bark of section 1, which was two years and four months old April 1, 1911, yielded 100 pounds 10 ounces of rubber in 209 days of tapping.

Sections 2 and 4 and Section 3 were tapped on renewed bark in two different tests in 1912. The tree was tapped, with short intervals, over a period of four years and nine months, with the following total yield:

	Lb.	Oz.
Original bark	172	0
Renewed bark, section 1, completely tapped.....	100	0
Renewed bark, sections 2 and 4, partly tapped.....	22	9
Renewed bark, section 3, completely tapped.....	97	4
Total	392	7

FEDERATED MALAY STATES RUBBER EXPORTS.

An official cablegram received from Kuala Lumpur announces that the export of plantation rubber from the Federated Malay States during the month of July amounted to 3,687 tons, as compared with 3,403 tons in June and 2,971 tons in the corresponding month last year.

The following is a comparative table showing the export for three years:

	1913.	1914.	1915.
January .....*tons*	2,131	2,542	3,473
February	1,757	2,364	3,411
March	1,737	2,418	3,418
April	1,626	2,151	2,777
May	1,225	2,069	2,708
June	2,005	2,306	3,403
July	1,781	2,971	3,687
Total	12,262	16,821	22,877

RUBBER YIELD IN THE MALAY STATES.

The reports of the different rubber plantation companies of the Federated Malay States show that the increase in production of crude rubber in 1914 over 1913 ranged from 9 to 77 per cent. Few estates show an increase in production of less than 20 per cent., while the average increase was about 23 per cent. The yield per acre varied between 230 and 447 pounds, the prevailing figure being about 300 to 350 pounds.

RUBBER IN SOUTH KURG, INDIA.

Ceara rubber grows almost in a wild state in the Kurg province of British India and the jungle growth has to be removed each year to enable the tappers to get about. At the conclusion of the tapping the tapping wounds are smeared over with a boiled solution of unslacked lime, sulphur and resin, to which cow dung is added to make a consistent paste. This solution is said to assist the trees in rapidly recovering from their wounds. The Ceara tree is more delicate than the *Hevea* and the practice is to tap but one-quarter of a section of the surface so as not to endanger the life of the plant. Some of the second generation of trees, planted in the early '80's, tapped in the half-herringbone style on a quarter surface to a height of 6 feet, have yielded on an average 2½ pounds of dry rubber during the three months of the tapping season, but the test was too severe and the trees soon died.

THE RUBBER TESTING STATION FOR JAVA.

A meeting in connection with the installation of a central rubber testing station for Java took place June 2 at Bandoeng, Java. The chairman announced that a generous friend had offered to provide a laboratory and that the government had promised to erect the necessary buildings free of cost. A sum of 19,500 florins ($7,839) was subscribed at the meeting. The total needed is 23,000 florins ($8,246). The committee will undoubtedly be able to start the work of installation soon. The station will be under the control of the Department of Agriculture at Buitenzorg.

REVIEW OF THE BALATA INDUSTRY IN DUTCH GUIANA FOR 1914.

By a Resident Correspondent.

THE European war and the new balata ordinance, without any doubt, were responsible for the damaging consequences on the colony's principal industry. When the war broke out in August of last year the balata industry in Dutch Guiana was in a flourishing condition and, today—one year later—the industry is a mere skeleton of its former robust condition.

To review the many *pros* and *cons* that have also helped to nearly destroy—at least for the present—the colony's most valuable asset, would be too long a tale to tell. To be brief, however, I will deal with the two main factors which were directly responsible for the stagnation in business, and which certainly had a most disastrous effect on the people of the colony, who, directly and indirectly, derive their existence from the balata industry.

The two largest concerns in the colony are financed from Holland. When the trouble in Europe began, and the impossibility of shipping balata was realized, the first black cloud in the horizon began to appear. It will be remembered the bulk of balata produced in Suriname normally finds its way to Germany via Holland. The entrance to that country was closed, no shipments could be made, and in consequence no bills could be negotiated. This state of affairs was made worse by the new ordinance, which came into force about that time, and which created a monopoly for the two Dutch companies in question.

The public, of course, were up in arms at what they considered an unfair advantage taken of them by the passing of these laws. Newspaper comment was sharp and bitter, and the public was on the point of rebelling, but, unfortunately, the spirits of the people are easily subdued, and as a natural consequence the matter was treated, like everything else here, as "a nine days' wonder," and public opinion was again quieted. THE INDIA RUBBER WORLD, through its correspondent at Dutch Guiana, made mention of the state of affairs existing in the colony on two or three occasions, and the matter was also the cause of some firm but polite diplomatic correspondence between Washington and the Hague; so much so that matters have been set right, and the inhabitants of the colony must thank the United States authorities for their deliverance. A well known New York firm carrying on extensive balata operations in the colony, was threatened—by the new ordinance—with the loss of several hundred thousand dollars, which was invested in the industry, and it is only because of the tact of their local representative, backed by an able colonial lawyer, and—as mentioned already—the interference of the authorities in Washington, that the situation was saved, and today one and all are able to invest money in balata undertakings on equal terms.

It would be out of place in correspondence of this nature to make public the under-handed actions of certain colonials concerned in this affair. Suffice to say the worst has passed and the colony in the near future—conditions being normal—will again make good.

Under the circumstances already recorded it could hardly be expected that the past year should prove a prosperous one. Apart from the war, and the trouble over the new ordinance, from the effect of which the peasant proprietors and laboring classes suffered considerably, there was also a large increase in the price of imported foodstuffs from the United States, which advanced the cost of living fifty per cent.

Trade in the colony continues to be depressed. All future financial arrangements are uncertain, and money is still being withheld, the circulation of which would be of great assistance to trade.

There are several thousand kilos. of balata tied up in the country awaiting a market, and this also has proved a further handicap to the industry. But holders of the product are sanguine of higher prices in the near future, and are holding on, although no reasonable offers would be refused. The production of balata for the year past, 1914, was 1,018,818 kilos., and the greater part of this is now in the colony.

I have written before on the subject of fostering trade relations between Dutch Guiana and the United States. I am convinced if United States interests were more extensive in this colony the present existing hard times would be unknown.

Why does American trade with Dutch Guiana lag so far behind? The bulk of foodstuffs consumed in the colony come from the United States; not a pound of beef, pork or flour eaten by balata men, gold men or anyone else comes in from any other country, and still our trade relations are so far behind what they should be.

In order to have all the information required by the producer and the consumer, I would suggest the co-operation of the United States government, which is showing great interest now in foreign trade. The American consul furnishes reports, but they are necessarily inadequate, since the consuls have no time to do this work. If the consulate had a commercial department, managed by a man of local business experience, in my opinion it would have some good results in drawing attention to the colony.

The people in Dutch Guiana are keen for American trade, and this is the time to act. Dutch Guiana certainly offers great inducements to the people of the United States if they will come down here with that spirit of enterprise which has made them famous at home. As far as this colony is concerned, it would be perfectly possible to realize the dream of the statesmen of both continents, namely, "America for Americans!"

AS TO CONDITIONS IN DUTCH GUIANA.

To the Editor of THE INDIA RUBBER WORLD:

In your issue of June, on page 500, appears a letter signed by J. S. Lawton in which the writer emphatically contradicts the contents of my contribution which appeared in the April issue of your paper under heading "Trade Opportunities in Dutch Guiana."

I was not in the least surprised to read the statements contained in that letter. Certain persons have been endeavoring to inflate local conditions with the object of quieting the minds of those people in the United States who have invested their hard-earned savings in a certain enterprise in Dutch Guiana, and naturally my article would be the means of creating considerable unrest among these investors.

Any one in the colony can prove that when my article was written the government was sending away balata men by the hundreds monthly, as there was nothing for them to do; and to avoid misery and, perhaps, internal trouble, the government adopted this course. If necessary I can forward consular data to verify the correctness of the statement. Again, the most important newspaper in the colony, "De Surinamer" (copy mailed with this), would certainly not comment so favorably on this article which Mr. Lawton claims to be "an injustice to the colony" if it were not a truthful statement of colonial affairs.

Paramaribo, June 24, 1915. J. B. PERCIVAL.

[The article from the Paramaribo journal mentioned above refers with evident approval to Mr. Percival's letter in THE INDIA RUBBER WORLD and gives no intimation that any of his statements, so sharply criticised by Mr. Lawton in our June number, were incorrect.—ED.]

EXPORTS OF BALATA AND RUBBER FROM BRITISH GUIANA.

		January 1 to July 15 1914.	1915.
Balata	pounds	368,969	853,291
To United Kingdom			729,189
To United States			124,102
Rubber		665	1,979

At a meeting of the Board of Agriculture of British Guiana in June it was urged by the Governor of the colony that more enterprise be shown in the planting of large areas of land suitable for rubber cultivation. He stated that rubber could be collected quite cheaply in the colony, but in order to do so the cultivation should be on a large scale, which would reduce the cost of superintendence. To give encouragement to planting, the Board of Agriculture has reduced the price of rubber stumps to $12 per thousand.

THE RUBBER SITUATION IN BRAZIL.

By Our Regular Correspondent.

THE crisis from which Brazil is still suffering began in the autumn of 1913, when coffee suffered a severe fall in price as rubber already had. The country had become accustomed to an extravagant manner of living, and therefore continued to import expensive foreign luxuries when the value of its exports had enormously decreased. European financiers had too great confidence in Brazil. They overestimated the credit of the country and thus helped it to continue impoverishing itself until the Balkan wars and the Mexican troubles came. The effect of these disturbances on the European money market was felt here in Brazil. European capital was distributed here with noticeably less prodigality. Then, in July, 1914, came the outbreak of the great European war which cut off altogether the supply of foreign gold and accentuated the financial weakness of our country. The crisis was aggravated.

It must be borne in mind that, though Brazil is a very large country, covering an area of some 3,218,130 square miles, its population of about 22,000,000 inhabitants is small for such a great territory, being, in fact, but a fraction more than six people to the square mile. This comparatively small population has always been in the way of the development of the natural resources of the country. The scarcity of labor makes its cost very high and this fact directly affects the gathering of rubber which for the past twenty years has been the principal resource of the Northern States of Brazil, and which, together with coffee, represents more than three-quarters of the total exports from this country.

The constantly increasing demand for rubber increased its price to such an extent that the Far East became interested. The immense wealth rubber was creating for Brazil led to the development of Malayan rubber plantations and the low cost of labor in the Far East created a competitor who soon produced more rubber than the Amazons. The price of Hard Fine Para, the standard type of Brazilian rubber, reached 12s. 6d. in 1910, but it fell to less than 2s. in 1914. This certainly explains the tremendous decrease in the value of Brazilian exports. The government was aroused and took measures to protect its rubber production, but they had little or no beneficial effect. Then the outbreak of the war in Europe buoyed up the hopes of our despairing rubber gatherers. The unusual conditions created by the outbreak of hostilities caused the price of our Hard Fine Para to rise to 2s. 7d. and it was hoped that old time prosperity would be at least temporarily restored. But this did not happen. The capacity, facilities and the organization of the Far Eastern rubber plantations were too great. Instead of increasing our output of crude rubber we allowed it to decline, the 1914-1915 crop being 6,000,000 pounds or more below the figures for the previous year. An increase in production might have compensated for the decrease in value, but for some reason or other Brazil did not follow the general practice and the crop was materially reduced.

This appears to be a mistake, for the applications of rubber are limitless and a country that can produce excellent rubber in large quantities should be able to hold its own against any competition. The efforts Far Eastern planters are constantly making to reduce the cost of production of their rubber should be to us an indication of the proper course to follow, unless we wish to have to mourn the total disappearance of rubber from among our exports. The forests of the Amazons contain vast reserves of fine rubber trees. The only trouble is the excessive cost of getting this rubber to market—the difficulty of reaching these fine trees, tapping them, converting their latex into crude rubber and getting this to the world's markets. Means of communication are lacking; the donkey's back is a conveyance far too costly under present conditions. The cost of production of our rubber must be materially reduced.

Conditions have already obliged the people to modify their ways of living. The planting of agricultural produce plants has been resorted to, but the results are not yet sufficient to materially relieve the situation. More organization is needed. Means of transportation must be provided. Rubber can no longer support the exorbitant 18 per cent. export duty now collected. Moreover the goods essential for the outfitting of the seringueiros must be subject to more reasonable customs duties. There is no adequate reason or argument for the high customs tariff which affects by 300 per cent. the price of some commodities. There is no reason for protecting industries that do not exist. The adoption of a reasonable tariff, adequate for the protection of the industries actually established in the country and at the same time permitting our rubber industry to survive, is what is needed here. It is doubtful if the government would lose any revenue to speak of, for certainly the effect of a reduction of the tariff would be to reduce the colossal scale upon which smuggling is here carried on.

We cannot reasonably hope for a rubber boom like that of 1910 to come with the re-establishment of peace. Condi-

tions today are quite different and the capacity of Far Eastern plantations is too great to allow of a rubber boom; but the height of our financial crisis was no doubt reached in the autumn of 1914, and we have every reason to believe that the government will help us in organizing our rubber production on some possible basis. The country has been struggling through a terrible crisis. It is now on the road toward health, but the financial situation will continue to be full of difficulties until the natural resources of the country can be organized solidly enough to exercise a beneficial influence on commercial conditions. Rubber is qualified to do more toward this than any other of our exports.

AMERICAN RUBBER MANUFACTURING PLANT IN BRAZIL.

In 1912 the Brazilian government enacted certain laws intended to induce foreign and domestic capital to invest in the establishment of rubber refining plants and rubber goods factories in Brazil. A premium of $130,000 gold was to be awarded to the first rubber refining plant established in that country, and another premium of $166,000 gold to the first company establishing, under certain conditions, a rubber manufacturing plant in Manáos, Pará, Pernambuco, Bahia and Rio de Janeiro. Materials and supplies necessary for the construction and complete installation of the factories, and chemical substances, fabrics and various materials necessary for the operation and maintenance of the factories during a term of 25 years, were to be admitted into Brazil free of import duty.

In order to have a right to the premiums, the factories would have to represent an actual investment of capital equal to four times the value of the premiums offered. The company satisfying the requirements and willing to accept the government's offers would have the right of appropriating lands required for the development of the factory. In addition, the government would give the factory preference in purchases of products used in the service of the army and navy and the federal public departments, as soon as the factory could compete in quality with similar foreign products. A Department of "Rubber Defense" (Defesa da Borracha appointed a committee to pass on bids submitted.

Taking advantage of these overtures of the Brazilian government, several companies, foreign and domestic, submitted proposals, among them The Goodyear Tire & Rubber Co. of South America—subsidiary of The Goodyear Tire & Rubber Co. of Akron, Ohio—organized under the laws of the State of Maine, with a capital of $3,000,000, for the declared purpose of operating rubber plantations and manufacturing rubber in South America. This corporation sent its director to Brazil to investigate conditions and decided on erecting a rubber manufacturing plant in Rio de Janeiro. Credentials presented to the Brazilian Rubber Defense Committee established the company's technical and financial capacity.

The bid of the Goodyear company covered the erection of a modern rubber manufacturing plant at Rio de Janeiro, to consist of ten 3-story buildings covering an area of over 150,000 square feet, to manufacture rubber tires, mechanical goods, combinations of rubber and asbestos, insulated wire, druggists' sundries, waterproof fabrics and different industrial preparations of rubber. The ownership of the real estate and other property involved in the factory was to revert to the Brazilian government in ninety years. The Defesa da Borracha committee accepted the Goodyear proposal, but the Brazilian government was apparently unable to carry out its part of the agreement and the contract remained in abeyance until June last, when it was ratified with some modifications.

A factory will be erected following the lines proposed by the Defesa da Borracha committee, in 1913, as modified by recent proposals made by the Goodyear company. The company relinquishes all its rights to premiums, while the Brazilian government loses its right of expropriation. The working of the factory is to begin within three years of the date of ratification of the agreement, and in case of non-compliance with the terms of the contract the company will forfeit whatever real estate it may have acquired and any buildings erected for the use of the factory, as also the security of $100,000 it deposited. Of course the whole agreement is subject to cases of "force majeure," of which the Brazilian government shall be judge.

THE BRAZILIAN VALORIZATION OF RUBBER.

According to late advices from Rio de Janeiro, the Chamber of Deputies of the Federal Government of Brazil has approved an issue of 350,000 contos ($90,000,000) paper, the greater part of which is intended for use in financing coffee and rubber.

This valorization scheme was worked out more than a year ago, after the election of the new president, Dr. Wenceslau Braz. It has the approval of all the militant parties of Congress. In fact, the president himself, in his message at the opening of the sessions, recommended this measure as a remedy for the financial depression in Brazil.

A part of the $90,000,000 is intended for the payment of treasury debts, both gold and paper, prior to 1915; but most of the issue will be deposited in the Bank of Brazil as a fund to make loans to holders of coffee and rubber.

The former valorization schemes, especially that for rubber, proved to be failures, in which the Bank of Brazil lost about $10,000,000. This gave the actual administration of the bank a lesson as to the means of employing valorization of the products, without the sacrifice of money deposited by the government for this purpose.

The idea is to deposit the products in warehouses. The bank will make loans to the producers up to about 80 per cent. of the value of the day's price, in the case of rubber. Coffee will have another plan of valorization. Thus the producers of rubber will not be forced to sacrifice their product by selling it to the intermediary, the exporter, at a price fixed two or three months before. (Generally the Amazonian rubber is sold for future delivery from two to four months ahead.)

The rubber having been deposited, the producer will offer it to the consuming markets. Receiving a price which will of course be in accordance with the supply and demand, the producer will sell it. This will do away with the actual speculation to which rubber is subject and which is so harmful to both producer and consumer. If by chance the price of rubber goes down, the producer will sell it in the same manner as at present, namely, have it sent to New York or London on consignment and receive 80 per cent. in cash. The only difference will be that the 80 per cent. will be advanced by the bank on the deposit of the rubber, settling the balance when the sale is made, instead of shipping it to the importing market and receiving 80 per cent. from the consignee. If the producer intends to speculate the bank will force him constantly to maintain a margin of 20 per cent. for its protection.

RUBBER IMPORTS FROM VENEZUELA, COLOMBIA AND HONDURAS.

During 1914, rubber exports from the port of Ciudad Bolivar, Venezuela, to the United States, amounted to $173,959, against $153,021 exported during the previous year; an increase of $20,938.

Balata exports from the same port to the United States amounted, in 1914, to $292,482, as compared with $220,496 exported in 1913; an increase of $71,986.

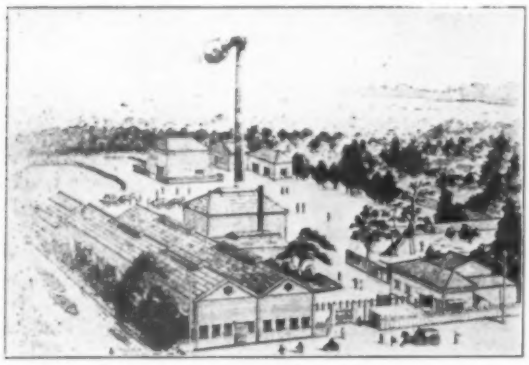
Rubber exports from Colombia to the United States amounted in 1914 to $89,104, as against $178,476 during the previous year; a decrease of $89,372.

During 1914 Honduras exported crude rubber to the value of $21,925 to the United States, against $17,417 during the previous year; an increase of $4,508.

Growth of the Rubber Industry in Japan.

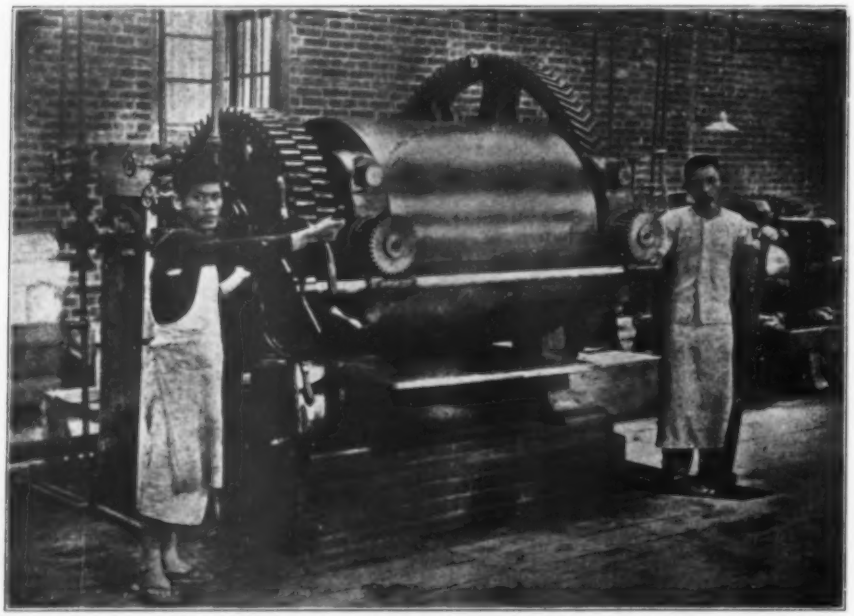
By a Resident Correspondent.

THE earliest rubber manufacturing enterprise in Japan was the Mitatsuchi Rubber Co., established in 1880, at Tokio, by Mr. T. Taski, for the manufacture and repair of divers' outfits. Vulcanization processes were but little understood by those in charge. They learned from English books that



TYPE OF JAPANESE RUBBER FACTORY.

results were obtainable by means of dry heat and proceeded to build a furnace arranged for burning wood under a pan filled with sand and provided with a close-fitting cover. The goods were placed in the sand and cured, with extreme irregularity, owing to the erratic temperature of the furnace. Seven years later a second rubber company was established, near Osaka and Kobe for the manufacture of rubber water bottles by the cold cure process.



MIXING MILL IN JAPANESE RUBBER FACTORY.

Vulcanization by steam was introduced in 1892 by the Mitatsuchi company, which a year later also began the manufacture of ebonite and suction hose.. The industry expanded under government support during the Chinese-Japanese war [1894-5]. It was not, however, until 1900 that European machinery and methods were generally introduced. This was done by the

BICYCLE TIRE SHOP.

Meiji Rubber Works of Tokio—organized in 1892 as The Tokyo Rubber Co.—under the instruction of an English expert. In that year four new rubber companies were established at Tokio, bringing the total number of Japanese rubber factories up to ten.

In 1908 English capital became interested in rubber manufacture in Japan and The Dunlop Rubber Co. (Far East), Limited, and The Ingram Rubber Co., established factories at Kobe. Since then rubber companies have rapidly increased in number, due to the distribution of practical rubber workers from the older concerns. The lines of manufacture now include tires, belting, hose, mechanicals, footwear, molded shoe soles, proofed cloth, druggists' sundries and dipped goods.

The development of the industry since its establishment in 1880 is shown by the following tabulation, which does not include the small toy balloon factories or repair shops, of which there are many in various parts of the country.

RUBBER COMPANIES IN JAPAN.

Year.	General Rubber Companies.	Insulated Wire Companies.
1880.....	1	0
1890.....	3	2
1900.....	10	2
1905.....	15	3
1910.....	26	6
1911.....	30	7
1912.....	47	7
1914.....	60	8

The following table gives the yearly imports of crude rubber since 1910 and of seven other years since 1886, when this commodity was first imported in any quantity:

JAPANESE IMPORTS OF CRUDE RUBBER.

Year.	Pounds.	Value [U. S. Currency.]	Year.	Pounds.	Value [U. S. Currency.]
1886.....	1,941	$489	1905.....	729,736	$422,975
1890.....	5,860	866	1910.....	1,590,918	1,515,093
1894.....	36,166	13,388	1911.....	2,054,864	1,530,008
1895.....	27,553	11,556	1912.....	2,004,010	1,514,560
1900.....	107,439	52,159	1913.....	2,681,943	1,725,922
1904.....	485,255	284,327	1914*.....	2,305,262	1,073,319

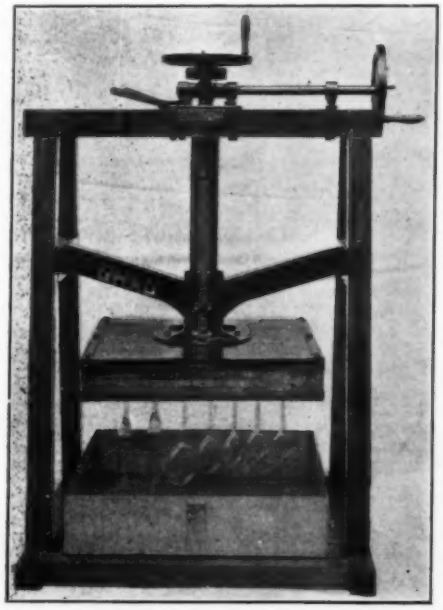
*Decrease due to British embargo.

In 1914 the general rubber companies had $2,500,000 capital and 4,000 workmen.

TYPICAL JAPANESE ADVERTISEMENT.

The wire insulating companies had about $3,000,000 capital and 3,000 workmen.

In addition to the incorporated companies there are hundreds of small plants where toy balloons and other articles are made by hand dipping. The larger companies, however, have displaced this hand work by a machine patented by Francisco A. Loayza, Peruvian Consul at Yokohama. The machine enables the operator to do more and better work. One machine can equal the output of 400 hand workers in the same time.



LOAYZA DIPPING MACHINE.

Japan's imports of rubber goods have also steadily increased since 1886, when they amounted to $26,862, until 1913, when, largely because of the development of the home industry, they commenced to decrease, 1914 showing a still further reduction, as indicated by the table which follows, and which gives the value of exports for the same years covered in the preceding import table:

JAPANESE IMPORTS OF RUBBER GOODS.

(Exclusive of submarine and underground cables.)

Year.	Value.	Year.	Value.
1886.....	$26,862	1905.....	$1,742,221
1890.....	67,376	1910.....	2,601,762
1894.....	94,593	1911.....	4,307,024
1895.....	154,375	1912.....	4,585,712
1900.....	595,204	1913.....	2,623,026
1904.....	796,599	1914.....	1,025,812

Japanese exports of rubber goods are made mostly to China and Asiatic districts, the value of such imports being, in 1913, $330,859, in 1914, $740,063. In addition to which, the annual exportation of toy balloons amounts to about $30,000.

JAPANESE RUBBER PLANTATIONS.

The Japanese rubber plantations are located in the Ogasawara Island, Formosa and in Malaysia and Borneo. Those in Formosa in 1894 began the cultivation of the vine "Gomu Katsura," but abandoned it in 1904 in favor of *Manihot*, *Hevea* and *Ficus*. The Formosa plantations comprise a total of 35,000 acres. The yield is not as good as that in Malaya, the climate being less favorable. The Japanese plantation area in Malaya totals 95,000 acres, of which 40,000 are cultivated and 1,881 acres yielding. The capital

JAPANESE RUBBER PLANTATION IN MALAY PENINSULA.

invested is $4,500,000 and it is estimated that $7,500,000 more will be needed to develop the total acreage.

In Borneo the Japanese have only 1,000 acres in rubber plantations.

The rubber manufacturing plants are at present enjoying excellent business, with special demand for toy balloons, the supply of which in Europe as well as in America has hitherto come largely from Germany.

Japan has a monopoly of the production of the rubber latex cups used in Ceylon and the Federated Malay States, where the demand reaches hundreds of thousands yearly.

LANDOLPHIA RUBBER EXPORTS FROM PORTUGUESE EAST AFRICA.

There was a time when the exportation of *Landolphia* was one of the principal items of the export trade of Mozambique Province, Portuguese East Africa, but it is rapidly becoming impracticable to export rubber from this province on account of the low prices prevailing in European markets. In 1913, though a large decrease in these exports had already occurred, their value still amounted to $44,665, but in 1914 it only amounted to $11,075. The supply of *Landolphia* is said to be practically unlimited, but it cannot be gathered profitably unless there is a marked improvement in European prices. Such an improvement is improbable and, at the present rate of decrease the rubber item will soon disappear from the export statistics of Mozambique.

Exports of crude rubber from the Nyassa Co.'s territory in Portuguese East Africa during 1914 amounted to $18,413

Recent Patents Relating to Rubber.

UNITED STATES OF AMERICA.

ISSUED JULY 20, 1915.

No. 1,146,787. Plastic composition for making receptacles. C. S. Dolley, Nelson, N. H.

1,146,789. Machine for making insoles. W. Fowler, assignor of one-half to C. H. Krippendorf—both of Cincinnati, Ohio.

1,146,851. Treatment of latex. S. C. Davidson, Belfast, Ireland.

1,147,032. Tire. W. D. McNaull, Toledo, Ohio.

1,147,102. Suction supporting device for mirrors. J. G. Knabe, Watertown, S. D.

1,147,111. Tire for vehicle wheels. J. J. Marsula, Pittsburgh, Pa.

1,147,149. Vacuum tread for tires. W. Dunbar, Greensburg, Pa.

1,147,179. Attachment for syringes. C. L. Loffler, Denver, Colo.

1,147,252. Method of making tire forming strips. J. T. Lister, Cleveland, Ohio.

1,147,253. Tire forming material. J. T. Lister, Cleveland, Ohio.

1,147,254. Apparatus for forming rubberized fabric tubes or strips. J. T. Lister, Cleveland, Ohio.

1,147,282. Stethoscope. K. M. Turner, Jamaica, N. Y., assignor to General Acoustic Co., New York, N. Y.

1,147,470. Anti-skidding device for dual tires. H. D. Weed, Syracuse, N. Y., assignor to W. B. Lashar, Bridgeport, Conn.

1,147,560. Massage apparatus. F. and W. Shurtleff—both of Moline, Ill.

1,147,563. Mold for the manufacture of rubber tires. T. Sloper, Devizes, England.

1,147,600. Tire. J. A. Borland, assignor of one-half to Powel Crosley—both of Cincinnati, Ohio.

Design.

47,612. Tire. H. W. Raymann, Portland, Ore.

ISSUED JULY 27, 1915.

1,147,740. Nipple for nursing bottles. M. H. McMann, New York, N. Y.

1,147,847. Electric vulcanizer. O. C. Dennis, Chicago, Ill.

1,147,969. Chicle in printer's blanket. G. Palmer, Chicago, Ill., assignor to G. L. Wilson, New York, N. Y.

1,147,977. Cushion tire. H. E. Schliebs, South Bend, Ind.

1,148,146. Slitting and rewinding machine. J. A. Cameron and G. B. Birch, New York, N. Y., assignors to Cameron Machine Co., Brooklyn, N. Y.

1,148,162. Bias cutting machine. W. A. Gordon, Shelton, assignor to Birmingham Iron Foundry, Derby—both in Connecticut.

1,148,171. Pneumatic core for repairing tires. A. L. Johnson and A. O. Alsten, assignors of one-fourth to H. C. Goulding, and one-fourth to J. A. Alsten—all of Worcester, Mass.

1,148,226. Method of manufacture of rubber water bottles. G. E. Hall, Akron, Ohio.

1,148,287. Pneumatic tube testing and tire carrying device. J. Closz, St. Ansgar, Iowa.

1,148,376. Pneumatic insole. S. S. Gay, Sedro Woolley, Wash.

1,148,381. Non-offset surface covering for impression cylinders. J. F. Haskins, New York, N. Y.

1,148,408. Tire. C. E. Robinson, G. W. Young and J. B. F. Showalter—all of Springfield, Mo.

1,148,427. Non-puncturable tire. H. and P. E. Bailey—both of Hillsdale, Ore.

1,148,476. Weather strip. G. H. Forsyth, Chicago, Ill.

ISSUED AUGUST 3, 1915.

1,148,504. Tire armor. R. W. David, Philadelphia, Pa.

1,148,566. Brush. T. F. Barry, assignor to Rubber & Celluloid Harness Trimming Co.—both of Newark, N. J.

1,148,952. Breast pump. H. L. Bruen, Brooklyn, N. Y.

1,148,953. Facial steamer or bath. G. W. Caldwell, Philadelphia, Pa.

1,149,007. Pneumatic tire. I. J. Webster, Haverhill, Mass., assignor to Reliance A. C. Co., Inc., New York, N. Y.

1,149,008. Pneumatic tire. I. J. Webster, Haverhill, Mass., assignor to Reliance A. C. Co., Inc., New York, N. Y.

1,149,083. Hose supporter. H. Rang, New York, N. Y.

Trade Marks.

66,745. Nathan D. Dodge Shoe Co., Newburyport, Mass. A seal with the words *The Correct Dodge Shoe.* For boots and shoes made of leather and rubber, etc.

77,564. Milton Ochs, Cincinnati, Ohio. The words *Gold Bond.* For raincoats, etc.

78,641. Charles Niedner's Sons Co., Malden, Mass. Illustration of a color line running longitudinally of and incorporated in the fabric. For linen hose.

82,230. Kabo Corset Co., Chicago, Ill. The word *Kabo.* For hose supporters.

83,400. Continental Rubber Works, Erie, Pa. The word *Vitalic.* For rubber hose connections, rubber valves, etc.

83,467. United & Globe Rubber Manufacturing Cos., Trenton, N. J. The word *Safety.* For rubber hose, rubber belting, etc.

83,854. L. H. Gilmer Co., Philadelphia, Pa. The word *Gilmer.* For transmission and conveying belts, etc.

84,004. William F. Hirschmann, New York, N. Y. The word *Bingle.* For rubber tobacco pouches, etc.

84,722. United Drug Co., Boston, Mass. The word *Rexall.* For rain coats, etc.

84,784. Bishop Gutta-Percha Co., New York, N. Y. Representation of an insulated electrical conductor. For insulated conductors and cables.

84,908. Service Motor Supply Co., Chicago, Ill. Illustration of a tire chain with the initials *S M S.* For tire fillers and patches for cementing.

85,207. The E. Z. Patch Co., Akron, Ohio. The initials E. Z. For cementing and vulcanizing patches for rubber goods.

85,280. William Mann Co., Philadelphia, Pa. The word *Mann's.* For fountain pens, rubber erasers, rubber bands, etc.

85,281. William Mann Co., Philadelphia, Pa. The word *Manco.* For fountain pens, rubber erasers, rubber bands, etc.

85,540. Mark Hydes, Newark, N. J. Illustration of a white tree on a black background, with the word *Nichicle.* For tree sap or gum of the *Ficus* vine.

85,958. Geo. Borgfeldt & Co., New York, N. Y. Illustration including a globe, a child and animals. For molded and decorated rubber toys, etc.

86,027. Bloomingdale Rubber Co., Butler, N. J. The word *Pahrah.* For reclaimed rubber.

86,137. The Helmet Co., Cincinnati, Ohio. The word *"Roundees."* For chewing gum confection.

86,199. Bishop Gutta Percha Co., New York, N. Y. Illustration of an Indian's head in a circle. For sheets or strips of gutta percha of tissue-like dimension.

86,365. Druggists' Supply Corporation, New York, N. Y. The words *Rubber-Rite.* For rubber face bottles, water bottles, syringes, etc.

86,404. The Omo Manufacturing Co., Middletown, Conn. The words *White Clover.* For dress shields.

86,462. The Whitney Blake Co., New Haven, Conn. A diamond shaped design with the initials *W B.* For insulated wire and cables.

86,467. Akron Tire Co., Inc., New York, N. Y. The word *Hercules.* For rubber vehicle tires.

86,520. The Mechanical Rubber Co., Jersey City, N. J. The word *Paxol.* For sheet packing composed of rubber or rubber combined with fabric and metal.

86,608. De Cou Brothers Co., Philadelphia, Pa. The words *De Cou Bros. Co.* so arranged as to form a shoe. For footwear made of rubber, etc.

86,627. United States Rubber Co., New Brunswick, N. J. The word *Fabrikhyde.* For rubber soled boots and shoes with canvas tops.

86,910. Mishawaka Woolen Manufacturing Co., Mishawaka, Ind. The word *Himiner.* For footwear of rubber and rubber combinations.

86,930. Eagle Pencil Co., New York, N. Y. The word *Princess.* For fountain pens.

86,931. Eagle Pencil Co., New York, N. Y. The word *Prince.* For fountain pens.

87,088. Pioneer Suspender Co., Philadelphia, Pa. The word *Diamond.* For garters.

ISSUED AUGUST 10, 1915.

1,149,171. Insulating varnish. C. Baeder, Hoboken, N. J.

1,149,224. Machine for reinforcing hose. S. J. Sill, assignor of one-half to H. H. Hewitt—both of Buffalo, N. Y.

1,149,271. Elastic waistband for trousers. A. Lazarus, New York, N. Y.

1,149,348. Ruling fountain pen. G. C. Eggers, Bovill, Idaho.

1,149,364. Method of making pneumatic tires. R. Griffith, assignor to Miller Rubber Co.—both of Akron, Ohio.

1,149,459. Automobile tire. E. J. Mitchell, Brooklyn, N. Y.

1,149,577. Caoutchouc substance and process of making same. K. Gottlob, Elberfeld, Germany, assignor to Farbenfabriken vorm. Friedr. Bayer & Co.

1,149,580. Caoutchouc substance and vulcanization product thereof. F. Hofmann, Elberfeld, and K. Gottlob, Vohwinkel, near Elberfeld, Germany, assignor to Synthetic Patents Co., New York, N. Y.

1,149,640. Cushion tire. H. E. Edwards, Warren, Ohio.

1,149,664. Hose construction. R. Many, Oak Park, Ill.

1,149,674. Detachable sleeve and rubber armlet therefor. P. J. Nichols, Walsenburg, assignor of one-sixteenth each to W. H. Doyle and H. Olsen, Telluride—both in Colorado.

1,149,749. Detachable tire tread. C. B. Gray, Gloversville, N. Y.

1,149,780. Quick detachable elastic tire. P. A. Painchaud, Plessisville, Que., assignor to J. Paradis and O. Gingras, Quebec—both in Canada.

1,149,782. Automobile tire. W. M. Peabody, Chicago, Ill.

1,149,841. Cover for pneumatic tires. R. Latour and A. Cappelle, Menin, Belgium.

1,149,849. Rubber hand stamp. T. O. Matthews, assignor to Jas. H. Matthews & Co.—both of Pittsburgh, Pa.

1,149,853. Roller apparatus for masticating plastic and like materials. J. H. Nuttall, Manchester, England.

1,149,897. Fabric containing india rubber. A. T. Collier, St. Albans, England.

1,149,950. Rubber coated protective apron. H. P. Rindskopf, New York, N. Y.

1,149,971. Rectal generator. J. B. Wagoner, deceased, Los Angeles, by Alma M. Wagoner, administratrix, San Francisco—both in California.

Trade Marks.

79,355. Colchester Rubber Co., Colchester, Conn., assignor to United States Rubber Co., New Brunswick, N. J. The word *Colchester* over a crown design. For rubber boots and shoes.

84,375. L. P. Larson, Jr., Co., Chicago, Ill. The word *Peptomint* in a rectangular design. For chewing gum.

86,251. C. P. Landreth, Philadelphia, Pa. The word *Ruboil.* For fabric belting.

86,472. Geo. Borgfeldt & Co., New York, N. Y. The letters *B. V.,* and the words *Knockout* and *Big Value.* For rubber and other toys.

86,622. The Republic Rubber Co., Youngstown, Ohio. The word *Invader.* For elastic vehicle tires.

86,724. A. H. Burt, Buffalo, N. Y. The word *Burco* and the letter *B,* in banner design. For chewing gum, etc.

87,276. Hood Rubber Co., Watertown, Mass. The word *Korker.* For tennis shoes with canvas top and rubber sole.

87,326. American Hard Rubber Co., New York, N. Y. The word *Handee.* For syringes.

87,500. Hershey Chocolate Co., Hershey, Pa. The word *Hershey's.* For chewing gum.

UNITED KINGDOM.

PATENT SPECIFICATIONS PUBLISHED.

The number given is that assigned to the Patent at the filing of the application, which in the case of these listed below was in 1914.

**Denotes Patents for American Inventions.*

[ABSTRACTED IN THE ILLUSTRATED OFFICIAL JOURNAL, JULY 14, 1915.]

*6,717 (1914). Life saving suit. J. Scarlett, Fourth avenue and Pine street, Seattle, Wash., U. S. A.

6,763 (1914). Vulcanizing india rubber. W. J. Mellersh-Jackson, 28 Southampton Buildings, London.

6,766 (1914). Hard rubber protecting pieces for edges of closet and lavatory basins, etc. Spezialfabrik fur Gesundheits-Technische Enrichtungen E. Katzenberger, 11 Bothmerstrasse, Munich, Germany.

6,824 (1914). Conveyor belt of balata, etc. W. H. Baxter, 71 Gelderd Road, Leeds.

*6,841 (1914). Life saving suit. C. J. Frid, Stege, Cal., U. S. A.

*6,842 (1914). Surgical syringe or irrigator. J. A. Speck, 465 N. Twelfth street, Salem, Ore., U. S. A.

6,944 (1914). Shampooing appliance. T. J. Jay, 2c Portman Mansions, London.

6,973 (1914). Administering anaesthetics. A. Humphries, Browning street, Napier, New Zealand.

6,994 (1914). Rubber in mud guard. E. D. House, 33 Black Horse Road, Kingswood, Bristol.

7,003 (1914). Breathing apparatus. W. J. Mellersh-Jackson, 28 Southampton Buildings, London.

7,022 (1914). Rubber spoke brush. W. Turner, 8 Philip Road, Peckham Rye, London.

7,025 (1914). Abdominal belt. P. A. E. Faure, 3 Rue Mirepoix, Toulouse, France.

7,048 (1914). Wire covering machine. N. Stott, "Sunnyside," Cavendish Road, Eccles, Lancashire.

7,075 (1914). Machine with vulcanite surface for drying and finishing laundry goods. A. M. D'Orsey, 34 Dennington Park Road, West Hampstead, London.

7,087 (1914). Metallic paint comprising rubber solution. British Patent Surbrite Co., and E. G. Meadway, 40 Trinity Square, London.

7,112 (1914). Cracking oils. Continental-Caoutchouc & Gutta Percha Compagnie, Hanover, Germany.

7,115 (1914). Teat cup for pneumatic milking machine. H. O. Baeckman, 96 Boulevard de la Senne, Brussels.

7,185 (1914). Wearing apparel. F. Barth, 151 Rudolfstrasse, Barmen, Germany.

*7,226 (1914). Tire braiding machine. W. H. Dunkerley, 143 Crooks avenue, and T. J. Arnold, 373 Broadway—both in Paterson, N. J., U. S. A.

7,250 (1914). Rubber segments in detachable rim attachments to wheels. T. Gare, 47 Thurlby Road, Wembley, Middlesex.

7,271 (1914). Elastic sleeve supporter. B. Lincke, 15 Brockhausstrasse Leipzig, Germany.

*7,280 (1914). Wheel tire. C. H. de Voll, 1324 Dearborn avenue, Chicago, Ill., U. S. A.

7,288 (1914). Air tubes for wheel tires. D. J. Chappell, 21 Swansea Road, Llanelly, Carmarthenshire.

7,299 (1914). Making hollow rubber articles. R. Daeschner, 9 Kreuzstrasse, Passing, near Munich, Germany.

7,310 (1914). Rubber projectile for toy firearm. Firm of B. Ulbricht, 13 Wanderstrasse, Nürnberg, Germany.

*7,314 (1914). Braiding machine. W. H. Joslin, P. O. Box 1231, Providence, R. I., U. S. A.

7,344 (1914). Medical irrigator. G. N. Clark, 53 Chancery Lane, London. (Meinecke & Co., 48 Park Place, New York, U. S. A.)

7,370 (1914). Vulcanizing india rubber. S. J. Peachey, 8 Halesden Road, Heaton Chapel, near Stockport.

7,375 (1914). Horseshoe with rubber pads. E. C. Purdue, Easthampstead, Bracknel, Berks.

[ABSTRACTED IN THE ILLUSTRATED OFFICIAL JOURNAL, JULY 21, 1915.]

20,501 (1913). Corset with gores of extensible material. H. Sefton-Jones, 285 High Holborn, London.

21,383 (1913). Nasal douche. H. Sefton-Jones, 285 High Holborn, London.

21,479 (1913). Diving dress. A. B. Dräger, and Drägerwerk H. & B. Dräger—both of 53 Moislinger Allee, Lubeck, Germany.

7,486 (1914). Dress shield. M. Heilbronn, 61 Ritterstrasse, Berlin.

*7,615 (1914). Double fountain pen. A. Badini, 410 East 120th street, New York City, and C. Schlesinger, 101 44th street, Corona, N. Y., U. S. A.

7,617 (1914). Tire cover or reliner. J. Liddle, 154 St. Vincent street, Glasgow.

7,666 (1914). Garter. F. G. Heath, St. George's Works, Birchfield Road, Headless Cross, Redditch.

7,822 (1914). Vehicle wheel with rubber and fiber tire. E. W. Bush, The Elms, Cobden avenue, Peterborough.

7,864 (1914). Filling for shoe soles. C. F. C. Morris, 49 Princes Road, Holland Park; A. B. Cross, 28 Caroline Place, Bayswater, and W. Piercy, 32 Connaught street, Paddington—all in London.

7,894 (1914). Medical syringe. J. Kelly, 48 Howland street, London.

7,955 (1914). Cleaning balls. F. V. Harte, 45 Bootle street, Manchester.

7,996 (1914). Tire cover. Herkules Pneumatik-Werke Ges., 10 Industriestrasse, and G. Milse, 69 Häfen—both in Bremen, Germany.

*8,110 (1914). Tire cover reinforced with hard rubber rings. F. Newbauer, Valley City, N. D., U. S. A.

8,121 (1914). Abrading rubber sheet, ribbon or strip. F. E. Blaisdell, 60 St. James' street, Westminster.

8,123 (1914). Winding strip rubber for making elastic tires. F. E. Blaisdell, 60 St. James' street, Westminster.

8,124 (1914). Measuring resilience. F. E. Blaisdell, 60 St. James' street, Westminster.

8,154 (1914). Tire Fabric. G. E. Heyl, King's House, Kingsway, London.

8,168 (1914). Toilet appliance. F. Starck, Pilsen, Bohemia.

[ABSTRACTED IN THE ILLUSTRATED OFFICIAL JOURNAL, JULY 28, 1915.]

8,324 (1914). Rubber buffers or protectors for furniture. C. Mason, 11 Tyning Terrace, Fairfield Road, Bath.

8,334 (1914). Brush with bristles set in rubber. W. L. B. Hinde, 5 Great Queen street, Kingsway, London.

8,405 (1914). Application of rubber to a pleating machine. H. Robinson, Albert House, Wellington Road, and H. N. Walsh, 24 Corporation Road—both in Eccles—and S. Redfern, 12 Swan Court, Market street, Manchester.

8,411 (1914). Tire repairing material. F. W. Farr, 30 Bridge street, Northampton.

8,608 (1914). Attaching dolls' heads, etc., by rubber cord. L. Rees, 46 Basinghall street, London.

8,686 (1914). Infants' rubber comforts. A. S. Morrison, 26 Duke street, Aldgate, London.

[ABSTRACTED IN THE ILLUSTRATED OFFICIAL JOURNAL, AUGUST 5, 1915.]

8,764 (1914.) Elastic band for cuff and sleeve supporter. H. J. Dieckmann, 4 Schillerstrasse, Stettin, Germany.

8,813 (1914). Rubber reinforcing strips in golf clubs, polo and croquet mallets, etc. P. A. Altman and Buchanan, Limited, 15A Pall Mall, London.

8,897 (1914). Teats for infants. H. Ruebeling, 24 Augusta Strasse, Cassel, Germany.

8,948 (1914). Reservoir pens. P. Cross, 34 Spencer Road, Wandsworth Common, London.

8,976 (1914). Soft ball for golf practice. H. L. Martin, Bishops Stortford Hospital, Herts.

9,066 (1914). Coagulating india rubber. R. C. Fulton, 68 Woodlands Road, and P. A. MacCallum, 93 Gope street—both in Glasgow.

9,136 (1914). Vulcanite device for tobacco pipes. H. E. Samuel, 6 Victoria Place, and C. J. Tanchan, 14 Carlton Chambers, High street—both in Newport, Monmouthshire.

[ABSTRACTED IN THE ILLUSTRATED OFFICIAL JOURNAL, AUGUST 11, 1915.]

*9,168 (1914). Boot, etc. F. A. Nolan, 701 New York Life Building, St. Paul, Minn., U. S. A.

9,195 (1914). Mosaic floorcloth with rubber tesserae. Bertrams, Limited, and R. F. Gillespie—both of St. Katherines Works, Sciennes, Edinburgh.

*9,212 (1914). Medical syringe. L. E. Pease, 205 College avenue, Somerville, Mass., U. S. A.

9,250 (1914). Billiard table cushion. Burroughes & Watts, and J. R. Abbott, 19 Soho Square, London.

9,303 (1914). Abdominal belt. W. G. Heys, 51 Deansgate Arcade, Manchester.

9,349 (1914). Waterproof apron or seat protector. J. H. Woodington, Sunhill, and E. H. Coles, Woodville—both in Clevedon, Somersetshire.

9,370 (1914). Plastic composition comprising jelutong, rubber, gutta, balata, rubber waste, etc. J. S. Campbell, 3 St. James' street, Piccadilly, London.

9,423 (1914). Stocking suspender. L. H. Wray, 19 Water Lane, Great Tower street, London.

9,554 (1914). Electric cable insulation. C. J. Beaver, Rangemoor, Crescent Road, Hale, and E. A. Claremont, Broom Cottage, High Leigh—both in Cheshire.

9,576 (1914). One piece rubber coat. A. Jacobson, 23 Grosse Bleichen, Hamburg, Germany.

9,590 (1914). Vehicle wheel. J. Spyker, 1D Sarphatistraat, Amsterdam.

9,591 (1914). Vehicle wheel. J. Spyker, 1D Sarphatistraat, Amsterdam.
9,592 (1914). Vehicle wheel. J. Spyker, 1D Sparhatistraat, Amsterdam.
9,600 (1914). Anaesthetic apparatus. W. J. Mevlan-Jones, 592 Stratford Road, Sparkhill, Birmingham.
*9,639 (1914). Life saving garment. T. E. Aud, Herndon, Va., U. S. A.
9,695 (1914). Rubber block paving. M. M. Dessau, 60 London Wall, London.
9,717 (1914). Fountain pen for producing lines of constant width. C. Schiktanz, 44a Kottbuser Ufer, Berlin.

NEW ZEALAND.

[ABSTRACTED IN THE PATENT OFFICE JOURNAL, JUNE 24, 1915.]

34,916 (1915). Milking machine teat cup. J. Paterson, TeAroha, and C. F. Wolfe, Waitoa—both in New Zealand.
36,064 (1915). Leather and rubber tires for penumatic wheels. J. B. Salmon, Filleul street, Dunedin, New Zealand.

[ABSTRACTED IN THE PATENT OFFICE JOURNAL, JULY 8, 1915.]

36,143. Puncture-proof pneumatic tire. J. A. Shearer, Methuen street, Prospect, S. A.

THE GERMAN EMPIRE.

PATENTS ISSUED (With Date of Validity).

286,808 (December 25, 1913). Belt guide for tapered belt pulleys. Ferdinand Wiss, Vallendar-on-the-Rhine, and Ernst Wolf, Bingen-on-the-Rhine.
286,696 (June 26). Vehicle tire with elastic filling material and attaching struts. Rudolf Keller, 16 Langestrasse, Stuttgart, and Anton G. Köppe, 47 Varrentrappstrasse, Frankfort-on-the-Main.

THE FRENCH REPUBLIC.

Patents Issued (with Dates of Application).

475,531 (July 31, 1914. Suspenders. A. Fodor.
475,538 (July 22). Apparatus for vulcanizing solid rubber tires. A. W. Gislow.
475,564 (July 22). Improved detachable vehicle wheel. C. W. Pride.
475,565 (July 22). Process for making rubber. J. Ostromislinsky.
475,570 (July 22). Pneumatic wheel. A. Brichot.
475,601 (July 23). Process for making an elastic substance identical or similar to vulcanized rubber. J. Ostromislinsky.
475,622 (July 24). Garter. Miss A. L. Thomas.
475,656 (July 25). Anti-skid arrangement for vehicle wheels. J. Kopeczky.
475,681 (July 25). Injector bulb. E. Vaille and H. Bosc.
475,714 (July 27). Nipple. Société des Etablissements Bognier et Burnet.
475,753 (July 28). Spare or emergency tire for automobiles and similar vehicles. S. C. Rand.

[NOTE.—Printed copies of specifications of French patents can be obtained from R. Bobet, Ingénieur-Conseil, 16 avenue de Villiers, Paris, at 50 cents each, postpaid.]

RUBBER IN FORD CARS.

LIKE most automobiles, Ford cars are provided with rubber pneumatic tires, rubber floor matting; all their wiring is insulated with rubber; lights and spark are commutated by a hard rubber switch; the tire pump is provided with a rubber hose; the horn is sounded by means of air forced to it from a rubber bulb through a rubber hose and the water jackets of the motor are connected with the radiator by means of heavy rubber tubes. This comprises all the rubber included in the standard equipment of the Ford car. Though the rubber in this standard equipment of the Ford is less per car, perhaps, than in the average automobile of other makes, it represents enormous quantities of rubber when we consider the fact that the production of Fords this year exceeded 330,000 cars.

But the above standard equipment in no sense includes all the current applications of rubber to the "universal car." In Fords, as in all modern motor cars, foot control plays an important part. In the Ford there are three pedals on which foot pressure is almost continuous, especially in heavy traffic. These soon wear smooth, and to prevent their feet from slipping on the pedals, drivers use rubber pedal pads molded from pliable rubber with deep corrugated ribs, assuring a firm grip for the foot. They are provided with metallic clasps and fit snugly over the controlling pedals.

The corrugated steel running boards of Ford cars also soon wear smooth and become slippery. Here again rubber in the shape of corrugated matting solves the problem of making these running boards safe to tread upon in all kinds of weather. A rubber weather strip attached to the bottom rail of the windshield makes the lower half of the latter both wind and rainproof. Rubber plugs or inserts stop the disagreeable rattle of the doors.

Many owners wish to preserve the cushions and add to the appearance of their cars. For this purpose the market offers them waterproof, rubberized mackintosh seat covers which, to complete the equipment should be accompanied by a top hood cover made of rubber drill or of mackintosh fabric, and a cover of the same material for the back of the seat. A hard rubber radiator cap with instrument indicating cooling water temperature adds to the completeness of one's Ford. Electric cigar lighters enclosed in a hard rubber body and controlled by a hard rubber electric push button are convenient for smokers, while hard rubber enamel makes a rich finish for the steering wheel, which may also be protected by a rubber slip cover. In the summer time when dust and gnats are flying about, goggles are necessary. One of the neatest and lightest types of goggles has a frame made of zylonite—a celluloid and rubber composition.

A prudent Ford driver never ventures on the road without a complete set of tools and some spare parts and emergency helpers, such as extra inner tubes, extra casings, a tire reliner, blowout patches, patching cement for both casings and inner tubes, vulcanizing cement, tire cut fillers and other articles produced by the rubber industry. As the Ford is a big consumer of water it is prudent to carry a folding water pail, and the best of these are made of heavy rubberized waterproof duck. Owners of Ford cars who do not use their machines during the winter months should cover them with water and dust-proof auto covers made of rubber cloth.

Estimating at $45.00 the value of the rubber goods entering into the standard Ford equipment, the 330,000 cars produced by the Ford Motor Co. in 1915, would represent $14,850,000 worth of manufactured rubber. By providing the Ford car with all the existing accessories containing rubber, the value of the rubber goods on each car would be increased to $100 or $33,000,000 for the 1915 Ford production. Of course the average Ford owner does not furnish his car with any such equipment and it would be safe to say that the average Ford car in daily use does not carry more than $60 worth of equipment, of which rubber is a component part. Still, in view of the Ford company's enormous production, this would represent an annual expenditure of $19,800,000 for rubber equipment.

IMPORTS OF CRUDE AND MANUFACTURED RUBBER AT THE PORT OF NEW YORK

THE QUANTITY IS GIVEN IN PACKAGES.

Week Ending—	India Rubber.		Rubber Waste.		Rubber Manufactures.		Substitutes.		Chicle.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
July 3, 1915	27,029	$2,095,144	460	$4,535	62	$9,706	14	$1,165	50	$3,176
July 10	23,492	1,922,652	342	6,072	40	4,420	17	756	4,833	404,899
July 17	42,964	3,788,289	245	2,862	103	15,953	..	...	94	5,933
July 24	13,411	898,763	40	327	11	3,312	..	...	17	3,356
July 31	23,673	1,951,137	525	2,193	74	7,725	..	...	114	3,177
August 7	25,603	1,879,681	388	11,948	127	25,083	..	...	490	84,723
August 14	20,838	1,727,543	...	3,654	33	6,485	..	...	...	....

Review of the Crude Rubber Market.

NEW YORK.

AUGUST 31, 1915.

THE local market for August was generally quiet—as a matter of fact almost stagnant. Only the small manufacturers seemed to be in the market; however, a few large orders for spot and future delivery were reported.

Early in the month First latex was quoted at 62 cents for spot in a dormant market and the situation continued with varying fluctuations of a cent to a cent and a half, until August 25, when the price broke to 59½ cents. Later in the week the price stiffened and First latex was quoted at 60 cents.

Pará sorts failed to receive serious attention from buyers. Upriver fine, spot, sold from 58½ cents at the first of the month to 56½ cents on August 28.

The New York imports of crude rubber for July were 7,570 tons, against 4,731 tons for June. July arrivals were divided as follows: Pará (Brazil), 1,378 tons; Pará (Europe), 78 tons; Plantation (London and Liverpool), 3,025 tons; Plantation (Singapore and Colombo), 2,189 tons; African, 379 tons; Manicoba, 68 tons; Centrals, 131 tons; Guayule, 322 tons. For the first two weeks of August the New York imports were 46,440 cases, valued at $3,607,224.

The receipts from Pará and Manáos to date are reported to be 400 tons in excess of the arrivals for the same period a year ago. The Booth Line steamship "Denis" is afloat from Pará and Manáos with 240 tons. The Lloyd Braziliero steamship "Sao Paulo" is due from Pará with 260 tons.

LONDON.

The rubber position early in the month of August was firm but with very little actual business to record. Deliveries were being made in excess of receipts. The July figures are 4,447 tons imported and 5,524 tons delivered, against 4,689 tons imported in June and 5,425 tons delivered.

Reports from the East indicate a much greater production for July than a year ago and the indications are that the Brazilian crop will be moving much earlier this season. It would seem, therefore, that we can reasonably look forward to ample supplies of crude rubber for the present and near future. Stocks at the end of July were 4,817 tons, against 3,242 tons in 1914. Spot prices for Standard crêpe were 2*s.* 5¾*d.* early in the month and closed around 2*s.* 4½*d.* on the 26th instant.

For the fiscal year ending June 30, 1915, the india rubber imports for the United States were 76,816 tons, as compared with 58,926 tons for the same period in 1914. Notwithstanding the British embargo there was an increase of 17,890 tons for the current year.

NEW YORK QUOTATIONS.

Following are the quotations at New York one year ago, one month ago, and August 31, the current date:

PARA.	Sept. 1, '14.	Aug. 1, '15.	Aug. 31, '15.
Upriver, fine, new	75 @80	60 @60½	57 @
Upriver, fine, old	.....	61 @63	58 @
Islands, fine, new	65 @70	51½@52	50½@
Islands, fine, old	.....	55 @56	52 @53
Upriver, coarse, new	55 @60	44 @	43 @
Upriver, coarse, old	.....	.....	43½@
Islands, coarse, new	45 @	28 @	27 @28
Cametá	40 @	31 @	28½@29
Caucho, upper	50 @	45½@	42½@43
Caucho, lower	....	43 @	40 @41
PLANTATION HEVEA.			
Smoked sheet ribbed	75 @80	Spot... 62 @ / Nearby 61½@	58½@59 / 58½@
First latex crepe	70 @75	Spot... 63 @ / Nearby 62½@	59 @60 / 58½@59
Fine sheets and biscuits, unsmoked	70 @75	60 @	57 @58
CENTRALS.			
Corinto	50 @	43½@	40 @
Esmeralda, sausage	45 @	42½@	40 @
Nicaragua, scrap	40 @	42 @	38 @39
Mexican, scrap	45 @	42½@	40 @41
Manicoba, scrap	.....	37 @38	35 @40
Mangabeira, sheet	.....	38 @	35 @40
Guayule	55 @	34 @35	32 @33
Balata, sheet	62 @64	55 @56	55 @56
Balata, block	....	47 @48	45 @47
AFRICAN.			
Lopori, ball, prime	.....	53 @54	53 @54
Upper Congo, ball, red	....	.....	51 @53
Massai, red	75 @85	52 @53	50 @52
Soudan Niggers	36 @46	.....	.....
Cameroon, ball	....	.....	44 @
Benguela	....	33 @	31 @
Accra, flake	....	22½@	23 @23½
Rio Nunez Niggers	.....	55 @	52½@53
Konakry Niggers	.....	53 @	51 @52
Gold Coast, lump	.....	27 @	.....
EAST INDIAN.			
Assam	....	44 @48	42 @
Pontianak	9 @	7¼@ 7½	6¾@7
Gutta Siak	....	12½@14	12½@14
Borneo II	....	.....	30 @
Gutta Percha	....	.50 @1.50	2.00@2.50

New York.

In regard to the financial situation, Albert B. Beers (broker in crude rubber and commercial paper, No. 68 William street, New York) advises as follows: "Our report for July regarding commercial paper in the rubber line covers the conditions for August, the best names being taken freely at 4@4½ per cent., and those not so well known, 5@5½ per cent."

NEW YORK PRICES FOR JULY (NEW RUBBER).

	1915.	1914.	1913.
Upriver, fine	$0.59@0.63	$0.68@0.75	$0.84@0.92
Upriver, coarse	.44@ .47	.40@ .42	.51@ .56
Islands, fine	.52@ .54	.57@ .60	.74@ .81
Islands, coarse	.28@ .30	.27@ .30	.29@ .34
Cametá	.31@ .32	.30@ .34	.37@ .40

United Kingdom.

IMPORTS OF RUBBER.

From—	July. 1913.	July. 1914.	July. 1915.	Seven months ending July. 1913.	Seven months ending July. 1914.	Seven months ending July. 1915.
Dutch East Indies....*tons*	...	...	249	...	...	1,542
French West Africa	41	10	66	788	214	388
Gold Coast	32	19	21	601	213	162
Other Countries in Africa	...	...	302	...	...	1,680
Peru	50	69	18	747	536	602
Brazil	827	592	847	11,341	9,098	8,353
British India	...	...	53	...	...	819
Straits Settlements	974	1,774	1,621	8,068	11,190	18,748
Federated Malay States	737	625	864	5,403	5,719	7,205
Ceylon and Dependencies	384	612	385	3,108	4,176	8,317
Other Countries	1,828	1,232	133	11,288	9,367	1,226
Total	4,873	4,933	4,559	41,344	40,513	49,042

EXPORTS OF RUBBER.

To—						
Russia *tons*	391	363	306	3,929	4,119	6,544
Germany	695	1,172	...	6,315	6,781	...
Belgium	143	172	...	1,134	1,351	...
France	392	554	788	2,800	4,132	4,005
United States	1,421	958	3,733	9,325	13,992	25,490
Other Countries	229	367	711	2,159	2,446	5,073
Total	3,271	3,586	5,538	25,662	32,821	41,112

Singapore.

Guthrie & Co., Ltd., report [July 7, 1915]:

Advices received from London during the past few days have indicated a much better tone in the rubber market and this was reflected at the Association Auction held today, some quite exceptional prices being paid. Pride of place was occupied by fine pale crepe, the price of $142 touched

marking an increase of $10 over last week's best. Bidding for this grade was particularly brisk, and all parcels were eagerly snapped up.

Fine ribbed smoked sheet was sold up to $140, an increase of $8.

Plain smoked sheet at $130 and unsmoked sheet at $126 were $3 better on the week.

Brown and dark crepes moved off freely at an average increase of about $5, while bark was also in good demand, showing an improvement of $4. Scraps were neglected.

About 146 tons were offered of which 140 tons were sold.

The following was the course of values:

	In Singapore, Picul.*	Sterling equivalent per pound in London.	Equivalent per pound in cents.
Sheet, fine ribbed smoked	$135@140	2/ 7⅜@2/ 8⅜	63.60@65.62
Sheet, fair to good ribbed smoked	129@134	2/ 6⅛@2/ 7⅛	61.06@63.09
Sheet, plain smoked	124@130	2/ 5 @2/ 6¼	58.79@61.32
Sheet, unsmoked	121@126	2/ 4⅛@2/ 5⅛	57.52@59.80
Crepe, fine pale	134@142	2/ 7⅛@2/ 8¾	63.09@66.39
Crepe, good pale	128@	2/ 5⅞@	60.56@
Crepe, fine brown	127@132	2/ 5⅝@2/ 6¾	60.05@62.33
Crepe, good brown	121@126	2/ 4⅝@2/ 5⅞	57.52@59.80
Crepe, dark	116@124	2/ 3⅛@2/ 5	55.49@58.79
Crepe, bark	107@118	2/ 1½@2/ 3¾	51.70@56.25
Scrap, virgin	97@102	1/11¾@2/ 0⅜	47.38@49.41
Scrap, pressed	102@	2/ 0⅜@	49.41@
Scrap, loose	80@ 96	1/ 7¾@1/11⅛	40.04@46.87

*Picul = 133⅓ pounds.
Quoted in S. S. dollars = 2/4 [56 cents].

Plantation Rubber from the Far East.

EXPORTS OF CEYLON GROWN RUBBER.

(From January 1 to July 19, 1914 and 1915. Compiled by the Ceylon Chamber of Commerce.)

To—	1914.	1915.
Great Britain ..... *pounds*	8,273,621	12,992,554
United States	4,615,246	7,033,921
Belgium	2,686,091	.....
Germany	971,761	.....
Australia	277,456	346,457
France	205,180	223,072
Japan	199,640	208,089
Russia	98,482	332,200
Straits Settlements	40,252	119,933
India	550	500
Italy	312	.....
Canada	.....	340,140
Total	17,368,591	21,596,866

(Same period 1913, 14,741,234 pounds; same period 1912, 5,937,788.)

The export figures of rubber given in the above table for 1914 include the imports re-exported. (These amount to 1,685,991 pounds). To arrive at the total quantity of Ceylon rubber exported for that period deduct these imports from the total exports. The figures for 1915 are for Ceylon rubber only.

TOTAL EXPORTS FROM MALAYA.

(From January to dates named. Reported by Barlow & Co., Singapore. These figures include the production of the Federated Malay States, but not of Ceylon.)

To—	Singapore. May 31.	Malacca. June 30.	Penang. June 30.	Port Swettenham. June 30.	Total.
Great Britain *pounds*	15,010,014	4,329,778	9,765,998	13,897,050	43,002,840
Continent	2,915,527	.....	599,332	20,160	3,535,019
Japan	734,708	.....	.....	.....	734,708
Ceylon	109,199	.....	217,333	754,291	1,080,823
United States	9,816,793	.....	110,000	.....	9,926,793
Australia	214,060	.....	.....	.....	214,060
Total	28,800,301	4,329,778	10,692,663	14,671,501	58,494,243
Same period, 1914.	15,195,659	2,548,819	8,614,533	13,950,414	40,309,425
Same period, 1913.	9,564,859	.....	5,863,467	13,226,350	28,654,676
Same period, 1912.	5,014,131	.....	3,211,759	9,344,140	17,570,030

IMPORTS FROM PARA AT NEW YORK.

[*The Figures Indicate Weights in Pounds.*]

JULY 26.—By the steamer *Stephen* from Pará and Manáos:

	Fine.	Medium.	Coarse.	Caucho.	Total.
Meyer & Brown	112,900	20,300	94,700	104,500=	332,400
Arnold & Zeiss	62,300	4,900	70,600	127,800=	265,600
Henderson & Korn	11,000	43,000	55,800	21,500=	131,300
Hagemeyer & Brunn	57,800	.....	2,300	33,400=	93,500
H. A. Astlett & Co	22,400	12,200	11,700	5,000=	51,300
Robinson & Co	44,000	3,300	700	.....=	48,000
Muller, Schall & Co	21,200	.....	7,000	.....=	28,200
W. R. Grace & Co	.....	.....	.....	26,500=	26,500
Neuss, Hesslein & Co	23,200	.....	.....	.....=	23,200
G. Amsinck & Co	19,700	.....	.....	.....=	19,700
J. T. Johnstone & Co	.....	.....	14,800	2,100=	16,900
General Rubber Co	5,500	.....	.....	.....=	5,500
Total	380,000	83,700	257,600	320,000=	1,042,100

JULY 30.—By the steamer *Rio de Janeiro* from Pará and Manáos:

Meyer & Brown	37,000	.....	29,900	80,800=	147,700
Arnold & Zeiss	9,400	1,100	6,300	75,600=	92,400
Henderson & Korn	16,000	400	46,400	18,800=	81,600
H. A. Astlett & Co	8,100	5,300	5,400	18,500=	37,300
G. Amsinck & Co	5,700	400	7,300	.....=	13,400
Total	76,200	7,200	95,300	193,700=	372,400

AUGUST 5.—By the steamer *Merity* from Pará:

Meyer & Brown	15,000	800	14,000	28,000=	57,800
Robinson & Co	31,100	.....	.....	.....=	31,100
H. A. Astlett & Co	700	.....	.....	.....=	700
Henderson & Korn	5,000	.....	.....	5,600=	10,600
Total	51,800	800	14,000	33,600=	100,200

PARA RUBBER VIA EUROPE.

JULY 26.—By the *Mayaro*=Ciudad Bolivar:

G. Amsinck & Co. (Fine)	25,000	
G. Amsinck & Co. (Coarse)	5,000	30,000

JULY 26.—By the *Tenadores*=Cristobal:

G. Amsinck & Co. (Fine)	18,000	
G. Amsinck & Co. (Coarse)	2,000	
W. R. Grace & Co. (Fine)	10,000	30,000

AUGUST 6.—By the *Panama*=Colon:

Neuss, Hesslein & Co. (Fine)	6,000	
W. R. Grace & Co. (Fine)	38,000	
W. R. Grace & Co. (Coarse)	3,000	47,000

AUGUST 9.—By the *Pastores*=Colon:

G. Amsinck & Co. (Fine)		10,500

AUGUST 13.—By the *Maravel*=Ciudad Bolivar:

Schutte, Bunemann & Co. (Fine)	30,000	
Schutte, Bunemann & Co. (Coarse)	30,000	
Yglesias, Lobo & Co. (Fine)	20,000	80,000

AUGUST 14.—By the *Alliance*=Colon:

Mecke & Co. (Caucho)		41,200

CENTRALS.

JULY 26.—By the *Tenadores*=Port Limon:

A. Held	500	
A. A. Linde & Co	700	1,200

JULY 28.—By the *Camagney*=Mexico:

Graham Hinkley & Co	3,500	
H. Marquardt & Co	1,500	
J. S. Sembrada & Co	1,000	
Harburger & Stack	2,000	8,000

JULY 29.—By the *Momus*=New Orleans:

E. Steiger & Co		40,000

JULY 29.—By the *Monterey*=Mexico:

American Trading Co	3,500	
General Export & Commission Co.	1,000	
J. A. Medina & Co	1,000	
H. Marquardt & Co	200	
Harburger & Stack	300	6,000

JULY 29.—By the *Santa Marta*=Cartagena:

International Banking Corp	3,500	
G. Amsinck & Co	3,000	6,500

JULY 31.—By the *Arapahoe*=Galveston.

Various	*655,000

AUGUST 2.—By the *Advance*=Colon:

G. Amsinck & Co	*9,000	
Pablo, Calvet & Co	3,500	
A. M. Capens' Sons	1,500	
Lanman & Kemp	2,000	
Piza, Nephews & Co	3,500	
J. S. Sambrada & Co	500	
Fidanque Bros.	500	20,500

AUGUST 2.—By the *Morro Castle*=Mexico:

E. Steiger & Co		500

AUGUST 3.—By the *Metapan*=Colon:

A. Held	500	
Isaac Brandon & Bros.	1,500	2,000

AUGUST 4.—By the *Ancon*=Colon:

G. Amsinck & Co		1,500

AUGUST 6.—By the *Almirante*=Colombia:

A. Held		1,500

AUGUST 6.—By the *Virgil*=Bahia:

Adolph Hirsch & Co	160,000	
Various	16,500	176,500

AUGUST 9.—By the *Pastores*=Colon:

Gontard & Co	4,000	
A. A. Linde & Co	1,000	
Isaac Brandon & Bros.	500	5,500

AUGUST 9.—By the *Tivives*=Kingston:

W. R. Grace & Co	1,000	
South American Commercial Co.	800	
Knox & Co	200	2,000

AUGUST 11.—By the *Justin*=Parnahyba:

J. H. Rossbach Bros	87,000	
G. Amsinck & Co	8,000	95,000

AUGUST 12.—By the *Minas Geraes*=Bahia:

Adolph Hirsch & Co	22,500	
Laurence Johnson & Co	15,000	37,500

AUGUST 13.—By the *Zacapa*=Cartagena:

International Banking Corp.	3,500	
Mecke & Co	1,000	4,500

AUGUST 13.—By the *El Occidente*=Galveston:

Various	*75,000

AUGUST 14.—By the *Alliance*=Colon:

G. Amsinck & Co	10,000	
Gontard & Co	200	
R. G. Barthold	200	
Muller, Schall & Co	2,400	
Piza, Nephews & Co	3,500	16,300

AUGUST 16.—By the *Cristobal*=Colon:

G. Amsinck & Co	5,000	
Pablo, Calvet & Co	4,000	
J. S. Sembrada & Co	800	
A. M. Capens' Sons	1,800	
Mecke & Co	2,500	
American Trading Co	500	14,600

AUGUST 16.—By the *El Mundo*=Galveston:

Various	*15,000

AUGUST 17.—By the *Mexico*=Mexico:

Lawrence Johnson & Co	10,000	
Graham, Hinckley & Co	1,500	
General Export & Commission Co.	200	11,700

AUGUST 17.—By the *Calamares*=Port Limon:

Isaac Brandon & Bros	3,500	
Graham, Hinckley & Co	1,000	
A. Held	100	4,600

AUGUST 20.—By the *Medina*=Galveston:

Various	*200,000

AUGUST 23.—By the *Siraola*=Puerto Cortez:

A. Rosenthal & Sons	5,000	
W. R. Grace & Co	2,000	
Manhattan Rubber Manufacturing Co.	1,000	
Eggers & Heinlein	800	
R. G. Barthold & Co	200	9,000

AUGUST 23.—By the *Arapahoe*=Galveston:

Various	*65,000

AFRICANS.

AUGUST 2.—By the *Saxonia*=Liverpool:

Rumsey & Greutert Co., Inc.	11,200	
Rubber Trading Co	40,000	
Henderson & Korn	45,000	96,200

AUGUST 2.—By the *Espagne*=Bordeaux:

Various	60,000

AUGUST 5.—By the *Den of Ogil*=Liverpool:

Goodyear Tire & Rubber Co	60,000	
Earle Bros.	10,000	70,000

AUGUST 9.—By the *Patria*=Lisbon:

S. R. Sequerra & Co	160,000

AUGUST 18.—By the *Dora Baltea*=Lisbon:

Robert Badenhop	135,000	
Edward Maurer Co., Inc	45,000	
W. H. Stiles	60,000	
S. R. Sequerra & Co	72,000	312,000

EAST INDIAN.

[*Denotes plantation rubber.]

JULY 26.—By the *Largo Law*=London:

Meyer & Brown	*35,000	
Robinson & Co	*70,000	
Aldens' Successors, Ltd	*89,000	
Arnold & Zeiss	*200,000	
Henderson & Korn	*20,000	
Firestone Tire & Rubber Co..	*105,000	
Rubber Trading Co	*25,000	
W. R. Grace & Co	*30,000	
Edward Maurer Co., Inc	*52,500	
Rumsey & Greutert Co., Inc.	*35,000	
L. Littlejohn & Co	*70,000	
General Rubber Co	*130,000	
Charles T. Wilson Co., Inc	*3,000	
Robert Badenhop	*3,500	
J. T. Johnstone & Co	*230,000	
W. H. Stiles	*27,000	*1,125,000

JULY 30.—By the *St. Cecilia*=London:

Robinson & Co	*90,000	
Charles T. Wilson Co., Inc	*3,000	
Robert Badenhop	*11,200	
L. Littlejohn & Co	*56,000	
Rumsey & Greutert Co., Inc..	*60,000	
Rubber Trading Co	*11,200	
Henderson & Korn	*25,000	
W. R. Grace & Co	*11,200	
The B. F. Goodrich Co	*315,000	
Arnold & Zeiss	*340,000	
Aldens' Successors, Ltd	*88,000	
J. T. Johnstone & Co	*34,000	*1,044,600

JULY 30.—By the *Adriatic*=Liverpool:

Robert Badenhop		*4,500

JULY 30.—By the *Cambrian*=London:

Meyer & Brown	*11,000	
The B. F. Goodrich Co	*125,000	
Raw Products Co	*50,000	
Goodyear Tire & Rubber Co..	*120,000	
Edward Maurer Co., Inc	*11,200	*317,200

AUGUST 2.—By the *Saxonia*=Liverpool:

Arnold & Zeiss		*4,500

AUGUST 3.—By the *Clan Farquhar*=Colombo:

Meyer & Brown	*78,500	
General Rubber Co	*70,000	
L. Littlejohn & Co	*180,000	*328,500

AUGUST 4.—By the *Mississippi*=London:

Firestone Tire & Rubber Co		*90,000

AUGUST 4.—By the *Mesaba*=London:

Charles T. Wilson Co., Inc..	*105,000	
Goodyear Tire & Rubber Co...	*33,500	*138,500

AUGUST 4.—By the *Inveric*=Singapore:

L. Littlejohn & Co	*175,000	
Henderson & Korn	*105,000	
General Rubber Co	*415,000	
The B. F. Goodrich Co	*205,000	
Hood Rubber Co	*30,000	
Robert Badenhop	*67,000	
Goodyear Tire & Rubber Co...	*400,000	
Charles T. Wilson Co., Inc...	*6,000	
J. T. Johnstone & Co	*60,000	
Edward Maurer Co., Inc	*20,000	
Aldens' Successors, Ltd	*97,000	*1,580,000

AUGUST 5.—By the *Den of Ogil*=Liverpool:

The B. F. Goodrich Co		*4,500

AUGUST 6.—By the *Ardgryfe*=London:

L. Littlejohn & Co	*75,000	
Rumsey & Greutert Co., Inc..	*4,500	
Rubber Trading Co	*22,500	
The B. F. Goodrich Co	*375,000	
Aldens' Successors, Ltd	*35,000	
J. T. Johnstone & Co	*9,000	
Robinson & Co	*11,200	*532,200

AUGUST 9.—By the *Kasenga*=Colombo:

Meyer & Brown	*105,000	
L. Littlejohn & Co	*133,500	
Edward Maurer Co., Inc	*3,000	
Various	*60,000	*301,500

AUGUST 9.—By the *St. Paul*=Liverpool:

L. Littlejohn & Co		*5,000

AUGUST 9.—By the *City of Bombay*=Colombo:

Meyer & Brown	*145,000	
L. Littlejohn & Co	*350,000	
J. T. Johnstone & Co	*50,000	
W. H. Stiles	*35,000	
Goodyear Tire & Rubber Co..	*7,000	*587,000

AUGUST 11.—By the *Minnehaha*=London:

Meyer & Brown	*35,000	
The B. F. Goodrich Co	*500,000	
Firestone Tire & Rubber Co..	*200,000	
Edward Maurer Co., Inc	*22,500	
Goodyear Tire & Rubber Co...	*12,000	*769,500

AUGUST 16.—By the *Tuscan Prince*=Singapore:

J. T. Johnstone & Co	*71,000	
Goodyear Tire & Rubber Co...	*105,000	
Henderson & Korn	*170,000	
L. Littlejohn & Co	*178,500	
W. R. Grace & Co	*45,000	
The B. F. Goodrich Co	*245,000	
Edward Maurer Co., Inc	*33,500	
Robert Badenhop	*67,000	
Charles T. Wilson Co., Inc...	*50,000	
Aldens' Successors, Ltd	*76,000	*1,041,500

AUGUST 16.—By the *City of Colombo*=Colombo:

Meyer & Brown	*120,000	
L. Littlejohn & Co	*150,000	
Aldens' Successors, Ltd	*44,000	
Various	*36,000	*350,000

AUGUST 16.—By the *Orduna*=Liverpool:

The B. F. Goodrich Co		*4,500

AUGUST 17.—By the *Saxon Monarch*=London:

Meyer & Brown	*34,000	
The B. F. Goodrich Co	*560,000	
Henderson & Korn	*18,000	
J. T. Johnstone & Co	*13,500	
Aldens' Successors, Ltd	*45,000	
Rubber Trading Co	*25,000	
Rumsey & Greutert Co., Inc..	*47,200	
Arnold & Zeiss	*22,500	
General Rubber Co	*22,500	*787,700

AUGUST 19.—By the *Huronian*=London:

Raw Products Co	*11,200	
Charles T. Wilson Co., Inc...	*160,000	*171,200

AUGUST 21.—By the *Cymric*=Liverpool:

The B. F. Goodrich Co		*15,000

AUGUST 21.—By the *Achilles*=Batavia:

Meyer & Brown	*290,000	
General Rubber Co	*270,000	
Edward Maurer Co., Inc	*270,000	
Manhattan Rubber Manufacturing Co.	*35,000	
G. Amsinck & Co	*20,000	
Aldens' Successors, Ltd	*27,000	
Various	*303,000	*1,215,000

AUGUST 23.—By the *Kioto*=Colombo:

Meyer & Brown	*100,000	
L. Littlejohn & Co	*150,000	
Edward Maurer Co., Inc	*100,000	
Robinson & Co	*100,000	
W. H. Stiles	*85,000	
Various	*5,000	*540,000

CUSTOM HOUSE STATISTICS.

PORT OF NEW YORK—JUNE, 1915.

Imports:	Pounds.	Value.
India rubber	18,728,677	$9,683,253
Balata	148,581	55,842
Gutta jelutong (Pontianak)	1,468,625	69,042
Rubber scrap	368,366	24,660
Total	20,714,249	$9,832,797
Exports:		
India rubber	5,605	$3,553
Balata	52,624	23,017
Rubber scrap, domestic	272,904	42,403
Rubber scrap, foreign	3,483	373

PORT OF NEW YORK—JULY, 1915.

Imports:	Pounds.	Value.
India rubber	18,243,010	$9,240,837
Balata	184,036	79,614
Gutta jelutong	1,001,910	53,739
India rubber scrap	286,255	14,929
Total	19,715,211	$9,389,119

PORT OF BOSTON—JULY, 1915.

Imports:		
Gutta percha	76,800	$9,809
Gutta jelutong (Pontianak)	326,406	21,293
Total	403,206	$31,102
Exports:		
Rubber scrap	5,874	$871

PORT OF CHICAGO—JULY, 1915.

Imports:		
Rubber scrap	36,714	$1,961

PORT OF CLEVELAND—JULY, 1915.

Imports:		
Rubber scrap	333	$16

PORT OF DETROIT—JULY, 1915.

Imports:		
Rubber scrap	65,593	$6,106
Exports:		
Rubber scrap	25,046	1,599
Reclaimed rubber	40,086	1,843

PORT OF NEW ORLEANS—JULY, 1915.

Imports:		
India rubber	397,505	$134,024

PORT OF NIAGARA FALLS—JULY, 1915.

Imports:		
Rubber scrap	48,200	$313
Exports:		
India rubber	157,459	88,056

PORT OF PHILADELPHIA—JULY, 1915.

Imports:		
Rubber scrap	16,082	$1,268
Exports:		
India rubber	22,139	15,829

PORT OF PORT HURON—JULY, 1915.

Imports:		
Rubber scrap	65,593	$6,106
Exports:		
Rubber scrap	25,046	1,599

PORT OF SAN FRANCISCO—JULY, 1915.

Imports:		
India rubber	9,738	$5,185

EXPORTS OF INDIA RUBBER AND CAOUTCHOUC FROM PARA, MANAOS, AND IQUITOS. FROM JANUARY TO JUNE, 1915.

	NEW YORK.					EUROPE.						Stock in	
EXPORTERS—	Fine.	Medium.	Coarse.	Caucho.	TOTAL.	Fine.	Medium.	Coarse.	Caucho.	TOTAL.	Total Exported.	Pará on June 30, 1915.	GRAND TOTAL.
J. Marques ..... *bilos*	275,861	87,823	548,578	241,215	1,153,477	680,686	30,782	143,175	156,758	1,011,401	2,164,878	80,000	2,244,878
General Rubber Co. of Brazil.	1,125,686	80,573	579,686	412,796	2,198,741	609,917	80,717	41,189	44,306	776,129	2,974,870	85,000	3,059,870
Suter & Co	336,790	68,841	440,648	208,747	1,055,026	328,047	46,452	22,933	152,966	650,398	1,605,424	105,000	1,710,424
Suarez, Hermanos & Co., Ltd.	350,947	5,144	85,317	65,546	506,954	489,926	.....	35,790	112,871	638,587	1,145,541	.....	1,145,541
Pires, Teixeira & Co	176,551	15,720	508,694	91,751	795,716	252,007	26,991	11,508	41,895	332,401	1,128,117	30,000	1,151,117
Adelbert H. Alden, Ltd	24,162	26,871	70,952	24,000	145,985	614,925	68,997	61,510	148,519	893,951	1,039,936	2,000	1,041,936
Seligmann & Co	127,659	340	13,820	88,499	230,318	11,419	.....	133	379	11,931	242,249	62,000	304,249
Zarges, Berringer & Co	141,385	2,991	21,638	62,351	228,365	.....	.....	.....	.....	.....	228,365	3,000	231,365
Stowell Bros	.....	.....	.....	.....	.....	50,760	4,660	10,971	45,015	111,406	111,406	.....	111,406
Sundries	220,847	23,830	154,753	173,093	572,523	196,215	14,829	35,554	34,191	280,789	853,312	12,000	865,312
	2,779,888	315,133	2,424,086	1,367,998	6,887,105	3,233,902	273,428	362,763	736,900	4,606,993	11,494,098	379,000	11,873,098
From Itacoatiara—direct	29,780	1,800	15,610	13,200	60,390	17,456	1,090	9,632	9,130	37,308	97,698	.....	97,698
From Manáos—direct	1,514,183	213,987	894,705	747,970	3,370,845	2,561,511	469,120	339,472	864,267	4,234,370	7,605,215	.....	7,605,215
From Iquitos—direct	261,349	19,126	90,583	380,929	751,987	257,115	20,001	56,342	210,431	543,889	1,295,876	.....	1,295,876
Stock in first hands in Pará.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	640,000	640,000
From Manáos on board *Boniface*	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	202,730	202,730
Stock held by syndicate J. Marques	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	390,000	390,000
Total	4,585,200	550,046	3,424,984	2,510,097	11,070,327	6,069,984	763,639	768,209	1,820,728	9,422,560	20,492,887	1,611,730	22,104,617

THE RUBBER SCRAP MARKET.

A GENERALLY quiet market prevailed during the entire month of August. The absence of large orders would indicate that the rubber mills are stocked. Prices have not varied to any great extent and with few exceptions have been nominal.

The New York imports of rubber scrap for July were 1,612 packages, valued at $15,989. For the twelve months ending March, 1915, Canada exported to the United States 4,235,610 pounds of rubber waste, valued at $278,442. Imports for the same period from the United States were 642,885 pounds, valued at $83,407.

During the month of June, Great Britain imported from the United States 190 bales of rubber scrap, valued at $30,079.

PRICES PAID BY CONSUMERS FOR CARLOAD LOTS.

New York, August 31, 1915.

	Per Pound.
Boots and shoes ..... *cents*	7¼@
White Goodrich and Goodyear tires	7 @
Morgan & Wright and U. S. tires	6¼@ 6½
Trimmed arctics	6 @ 6¼
Auto tires, mixed	5 @ 5⅛
Solid tires	4⅛@
No. 1 inner tubes	25 @26
No. 2 inner tubes	11¼@11½
Red tubes	12½@
Bicycle tires	3 @ 3⅛
Irony tires	1¼@ 2¼
No. 1 auto peelings	8 @ 8½
Mixed auto peelings	6¾@ 7
No. 1 soft white rubber	11 @12
White wringer rubber	9¼@ 9½
No. 1 red scrap	10 @10¼
Mixed red scrap	7¼@ 7½
Mixed black scrap	2½@ 2¾
Rubber car springs	3¼@
Horse shoe pads	3 @ 3¼
Matting and packing	½@ ¾
Garden hose	¾@ ⅞
Air brake hose	5 @
Cotton fire hose	1¾@ 2

THE MARKET FOR COTTON AND OTHER FABRICS.

THE placing of cotton on the absolute contraband list by Great Britain during the past month has naturally caused a very uncertain feeling in the cotton trade. The southern planter is in about the same position that he was a year ago with a considerable hold-over stock in the storehouse and the new crop coming rapidly along. The United States government will be asked to help finance the crop and England has signified a willingness to assist in relieving the situation, which is beset with uncertainties for the planter. It is reported that the present stocks at Liverpool are double those held last year at this time.

SEA ISLAND COTTON.

The Sea Island crop for the year 1914-15 was distributed as follows: Georgia, 42,395 bs.; Florida, 33,613 bs.; South Carolina, 5,590 bs.; making a total of 81,598 bs. These are the figures for the grown crop, while the commercial crop is given as 78,857 bs.; which leaves 2,741 bs. held at interior points.

The acreage of the growing crop is reported to be larger than last year; the estimates vary from 20 to 25 per cent. However, the fact that less fertilizer has been used may offset the increase in acreage. In some sections the difference is plainly seen in the growing plant. Generally speaking, the new crop has a good start under favorable conditions that would point to a good average crop. Stocks on hand at Savannah on August 20, 1915, were 1,856 bs., against 2,055 bs. for the same period a year ago. At Charleston there were 170 bs., against 37 bs. Savannah quotations on August 20 were as follows: Extra choice, 23 cents; fancy, 24 cents.

EGYPTIAN COTTON.

In Alexandria, Egypt, the July markets have been weak, due to the general impression that the war will be prolonged with disastrous results to the cotton trade. The spot market has been generally inactive during the entire month and with the exception of a few buyers of Afifi and Uppers very little trading was done. Spot quotations August 17, c. i. f. Boston (shipment from Alexandria), were as follows: Afifi, $12.38 to $18,25; Upper, $13.00 to $15.63; Nubari, $15.50 to $18.30; Sakelarides, $17.68 to $22.88.

FABRICS.

The cotton embargo has not affected the New York fabric market except to stiffen prices. In some quarters it is believed that the present prices are wholly controlled by foreign business and as long as the looms are busy on war supplies there will be a strong market and one that will not be altogether influenced by the scarcity or abundance of raw cotton.

The duck market is strong, with advancing prices. The foreign demand for numbered duck and army duck is increasing. The price of hose and belting duck will doubtless be advanced, for there is already a scarcity of looms necessary to take care of present foreign business.

Tire fabrics for domestic account are active and deliveries show a tendency on the part of the manufacturers to lay in stocks. Foreign business is increasing and it is generally reported that the fabric mills are about sold up.

The situation in rubberized fabrics for the best garment trade is a healthy one and there is a good demand for tweed and covert effects. The market seems to be filled with cheap cotton print goods that do not sell. Evidently the trade is waking up to the fact that cheap rubberized goods are dear at any price.

The following are New York quotations on August 31, 1915:

Imported Woolen Fabrics Specially Prepared for Rubberizing—		
Plain and Fancies:		
63-inch, 2¾ to 3 ounces per sq. yd.	*yd.*	$ .35 @$1.50
36-inch, 2¾ to 3 ounces per sq. yd.		.32½@ .57½
Plaid Linings:		
63-inch, 2 to 4 ounces per sq. yd.	*yd.*	.32½@ .50
36-inch, 2 to 4 ounces per sq. yd.		.20 @ .40
Domestic Worsted Fabrics:		
36-inch, 4½ to 8 ounces per sq. yd.	*yd.*	.20 @ .30
Aeroplane and Balloon Fabrics:		
Wamsutta, S. A. I. L. No. 1, 40-inch	*yd.*	.22
No. 4, 38½-inch		.22
O/X B. 36-inch		.10¾
Wool Stockinettes—52-inch:		
A—14-ounce	*yd.*	1.12½
B—14-ounce		1.25
C—14-ounce		1.50
D—14-ounce		.46
E—11½-ounce		.36
F—14-ounce		.50
G— 8-ounce		.40
H—11-ounce		.45
I— 9-ounce		.37½
Colors—white, black, blue, brown.		
Tire Fabrics:		
17¼-oz. Sea Island, combed	*sq. yd.*	$ .58@$ .60
17¼-oz. Egyptian, combed		.45 @ .47
17¼-oz. Egyptian, carded		.42@ .44
17¼-oz. Peelers, carded		.35@ .37
Sheetings:		
40-inch 2.50-yd.	*yd.*	.06¼
40-inch 2.70-yd.		.06½
40-inch 2.85-yd.		.06¼
40-inch 3.15-yd.		.06¼
Osnaburgs:		
40-inch 2.25-yd.	*yd.*	.07¼
40-inch 2.48-yd.		.07
37½-inch 2.42-yd.		.07
Mechanical Ducks:		
Hose	*lb.*	.21
Belting		.20
Carriage Cloth Duck:		
38-inch 2.00-yd. enameling duck	*yd.*	.11
38-inch 1.74-yd.		.12
72-inch 6.66-yd.		.25½
72-inch 7.21-yd.		.26½
Drills:		
38-inch 2.00-yd.	*yd.*	.10¼
40-inch 2.47-yd.		.08¾
52-inch 1.90-yd.		.11¼
52-inch 1.95-yd.		.11
60-inch 1.52-yd.		.14
Yarns:		
Garden Hose 12/2 cabled	*lb.*	.21
Fire Hose 12/1		.17@.19
Burlaps:		
32—7½-oz.	100 *yd.*	$5.70
40—7½-oz.		6.00
40—8-oz.		6.10
40—10-oz.		7.65
40—10¼-oz.		7.75
45—7½-oz.		7.10
45—8-oz.		7.20
48—10-oz.		10.25

THE MARKET FOR CHEMICALS AND COMPOUNDING INGREDIENTS.

THE month of August was a particularly quiet one in the rubber chemical trade, and prices, with a few exceptions, have remained the same as a month ago.

The fillers have been in normal demand at prices that have shown little change during the month. Barytes, both pure white and off color, have declined about $2 a ton. The producers of whiting are still having difficulty in securing chalk supplies, yet prices have not changed. Asbestos, talc and magnesia carbonate are nominal.

The pigments have been quoted freely. Domestic lithopone has had a good demand, at prices slightly under last month, and zinc sulphide remains firm. There has been little or no change in zinc oxide during the month. Crimson antimony is difficult to obtain; in fact there is so little in the market that quotations are withheld.

About the middle of the month pig lead eased off in price and later, red oxide, sublimed blue lead, and white lead basic sulphate all declined about one cent a pound. Domestic litharge also shows a small decline, and there is little foreign litharge offered. Hydrated lime has declined a cent a pound and calcined magnesia is nominal.

Dry colors have been quiet, with the exception of Prussian blue, which has been selling far above the normal figures. Soluble aniline colors are quoted from day to day at $2@2.50 a pound, the normal price being from 75 cents to $1.

Acetic acid has also advanced, glacial selling for 15 cents. Acetone has advanced to 28@29 cents, and toluol is selling for $5 per gallon, due to the active foreign demand that includes benzol. Carbon tetrachloride in drums has declined to 15 cents.

Late in August the naphthas advanced one and two cents a gallon, following the advance in crude petroleum.

PRICES OF CHEMICALS AND COMPOUNDING INGREDIENTS.
NEW YORK, AUGUST 31, 1915.

Acetone (drums)	lb.	$0.28	@$0.29
Acid, acetic, 28 per cent. (bbls.)	lb.	2.75	@ 2.90
glacial (carboys)	lb.	.15	@
Aluminum Flake (carloads)	ton	18.00	@20.00
Ammonium carbonate		None	
Antimony, crimson, sulphuret of (casks)		None	
golden, sulphuret of (casks)	lb.	.60	@ .70
Asbestine	ton	19.00	@20.00
Asbestos	lb.	.04	@ .05
Asphaltum "G" Brilliant	lb.	.03	@
Barium sulphate, precipitated	ton	70.00	@90.00
Barytes, pure white	ton	16.00	@22.50
off color	ton	12.50	@14.00
Basofor	ton	90.00	@
Benzol, pure	gal.	.90	@ 1.00
Beta-Naphthol	lb.	2.00	@ 2.50
Black Hypo	lb.	.25	@
Blanc Fixe	lb.	.03	@ .03¼
Bone ash	lb.	.06½	@
black	lb.	.06	@
Cadmium tri-sulphate		None	
yellow		None	
Cantella gum	lb.	.30	@ .75
Carbon, bisulphide (drums)	lb.	.06½	@ .07½
black (cases), Boston	lb.	.07	@
tetrachloride (drums)	lb.	.15	@
Caustic soda, 76 per cent. (bbls.)	cwt.	2.25	@ 2.50
Chalk, precipitated, extra light	lb.	.04	@ .04½
China clay, domestic	ton	8.00	@ 9.00
imported	ton	16.00	@24.00
Chrome, green	lb.	.08	@ .10
yellow	lb.	.13	@ .14½
Cotton linters	lb.	.05	@
Di-chlorethane (drums)	lb.	.12	@ .12½
Emarex	ton	70.00	@
Gas black	lb.	.05½	@ .06½
Gilsonite	ton	37.50	@42.50
Glycerine, C. P. (drums)	lb.	.25	@
Graphite, flake (250 to 400 pound bbl.)	lb.	.14	@
powdered (250 to 400 pound bbl.)	lb.	.05	@
Green oxide of chromium (casks)	lb.	.30	@ .35
Ground glass	lb.	.03	@
Iron oxide, red, reduced grades	lb.	.02	@ .05
red, pure	lb.	.05	@ .08½
Infusorial earth, powdered	ton	50.00	@
bolted	ton	60.00	@
Ivory, black	lb.	.08	@ .12
Indian red	lb.	.02½	@ .05½
Lampblack	lb.	.04	@ .08
Lead, red oxide of	lb.	.06½	@ .06¾
sublimed blue	lb.	.05⅞	@ .05⅞
white, basic carbonate	lb.	.06¾	@
white, basic sulphate	lb.	.05½	@ .05¾
Lime, flour	lb.	.01	@ .01½
hydrated	lb.	.01	@ .02
Litharge	lb.	.06	@ .06½
English	lb.	.10	@ .11
Lithophone, domestic	lb.	.07½	@ .08
imported	lb.	.07	@
Magnesia, carbonate	lb.	.04¼	@ .05½
calcined, heavy	lb.	.06¾	@ .09¾
light	lb.	.20	@ .25
Magnesite, calcined, powdered	ton	36.00	@
Mica, powdered	lb.	.03½	@ .05
Mineral rubber	lb.	.01¾	@ .04½
Naphtha, stove gasolene (steel bbls.)	gal.	.15	@
66@68 degrees	gal.	.20	@
68@70 degrees	gal.	.21	@
Oil, aniline	lb.	1.30	@ 1.50
corn, crude	lb.	.06½	@ .06¾
linseed (bbl.)	gal.	.50	@
paraffin (cases), Boston	gal.	.22	@
pine (cases), Boston	gal.	.45	@
rosin, heavy body	gal.	.25	@ .55
tar (cases), Boston	gal.	.24	@
soluble aniline colors, yellow, orange, red, violet, blue, green	lb.	2.00	@ 2.50
Orange mineral, domestic	lb.	.08¾	@
Paragol	lb.	.06	@
Petroleum grease	lb.	.03	@
Pine tar, Boston	gal.	.14	@
Pitch, burgundy	lb.	.03½	@ .05
pine, Boston	cwt.	1.75	@
Plaster of paris	cwt.	.75	@ .80
Prussian blue	lb.	1.10	@ 1.20
Pumice stone, powdered (bbls.)	lb.	.02	@ .03
Resin, Pontianak, refined	lb.	.14	@
granulated	lb.	.10	@
fused	lb.	.10	@
Rosin (280 and 500 pound bbls.)	lb.	3.70	@ 7.50
Rotten stone, powdered	lb.	.02½	@
Rubber black	lb.	.02½	@ .03
Rubber flux	lb.	.05	@ .06
Rubber substitute, black	lb.	.06	@ .07½
white	lb.	.07½	@ .15
Shellac, fine orange	lb.	.22	@ .25
Soapstone, powdered	ton	8.50	@20.00
Starch, corn, powdered	lb.	.02½	@
Sulphur chloride (drums)	lb.	.06½	@ .07½
Sulphur, flowers	cwt.	2.20	@ 2.60
Sulphuric acid	lb.	.01¼	@ .02
Talc, American	ton	9.00	@13.00
French	ton	15.00	@20.00
Toluol, pure	gal.	5.00	@
Tripolite earth, powdered	ton	50.00	@
bolted	ton	60.00	@
Turpentine, pure gum spirits	gal.	.44	@ .45½
wood, Boston	gal.	.38	@
Ultramarine, blue	lb.	.05	@ .16
Vermilion, brilliant	lb.	.90	@
Chinese	lb.	.95	@ 1.00
English	lb.	1.35	@ 1.50
Wax, bayberry	lb.	.22	@ .24
beeswax, white	lb.	.47	@ .49
ceresin, white	lb.	.14	@ .16
carnauba	lb.	.23	@ .45
Ozokerite, refined white	lb.	.45	@ .50
montan	lb.	.22	@ .24
Paraffin, refined, 118/120 m. p. (cases)	lb.	.03¾	@
123/125 m. p. (cases)	lb.	.04	@
128/130 m. p. (cases)	lb.	.04½	@
133/136 m. p. (cases)	lb.	.06	@
crude, white, 117/119 m. p. (bbls.)	lb.	.03½	@
yellow, 124/126 m. p. (bbls.)	lb.	.03½	@
Whiting, Alba, factory	ton	6.50	@ 7.50
commercial	cwt.	.50	@ .55
gilders	cwt.	.55	@ .65
Paris white, American	cwt.	.70	@ .75
English cliffstone	cwt.	.90	@ 1.25
Wood alcohol	gal.	.47	@
Yellow ochre	lb.	.01¼	@ .02
Zinc oxide, American process (factory) horse head.			
"special"	lb.	.08¼	@
"XX red"	lb.	.07¼	@
French process, green seal	lb.	.30⅝	@
red seal	lb.	.30⅛	@
white seal	lb.	.31⅛	@
Zinc sulphide	lb.	.06¾	@ .07

London prices, August 6, 1915, were as follows: Benzol, per gal., 90 per cent., 1s. ½d.@1s. 1d.; lead, English red, per ton, £33, less 2½ per cent.; English dry white, £31 17s. 6d.; ground, £35 15s.; sulphur, per ton, roll, £10 10s. ex wharf net; flowers, £11.

COTTON LINTERS USED IN RUBBER COMPOUNDING.

Cotton linters is the trade name of soiled short fiber waste product from ginning cotton. Heretofore it has been utilized chiefly as mattress topping and in the upholstery trade generally. Recently it has been found that it affords a cheap fiber adapted to rubber compounding for special purposes. The price runs as low as 3½ cents per pound in large lots, but varies with the amount and market conditions. Today the price is 5 cents per pound in bales of about 400 pounds.

INDIA RUBBER WORLD
FOUNDED 1889
CAOUTCHOUC GUTTA-PERCHA

Vol. 52. SEPTEMBER 1, 1915 No. 6.

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HARD RUBBER ENGRAVING MACHINE.

ILLUSTRATED herewith is a machine that engraves plain and ornamental letters, designs, trade marks, etc., on hard rubber articles, by means of a pantograph link motion. It will copy any size from 0.039 inch up to 4¼ inches in the proportion of 1 to 1 down to 10 to 1. Thus a surface of 4¼ inches square can be covered with the pantograph alone. By means of the transverse and longitudinal slide motion of the table, both of which have graduated dials to facilitate the setting of the work, the total area is increased to approximately 10 x 12 inches. The chief limitation of these machines has been a gradual loss of accuracy due to wear on the spindle bearings. In the S & S machine, however, the wear is reduced to an absolute minimum. This is accomplished by taking up the side pull, due to the small driving belt, on a stationary sleeve. The power is transmitted to a small spring collar which is clamped to the end of the spindle by two small pins. This means that the machine will retain its high degree of accuracy almost indefinitely.

The other good points are the strong, rigid construction and the micrometer adjustment of the cutter which can be instantly raised from the work by a lever. The machine is manufactured by Schuchardt & Schütte, 90 West street, New York.

A PNEUMATIC JACK LIFT.

A new jack lift operated by compressed air has recently been placed on the market. The air may be supplied either from an ordinary hand air pump or from the mechanical air pumps which are now part of the equipment of a great number of motor cars. This jack is sold with 3 feet of rubber air hose and it will be appreciated by motorists who know the difficulties of operating with the ordinary lift jack under the rear axle of a machine. Supplied with air from an ordinary hand pump this jack is capable of lifting a six-ton truck. [National Motor Supply Co., Cleveland, Ohio.]

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